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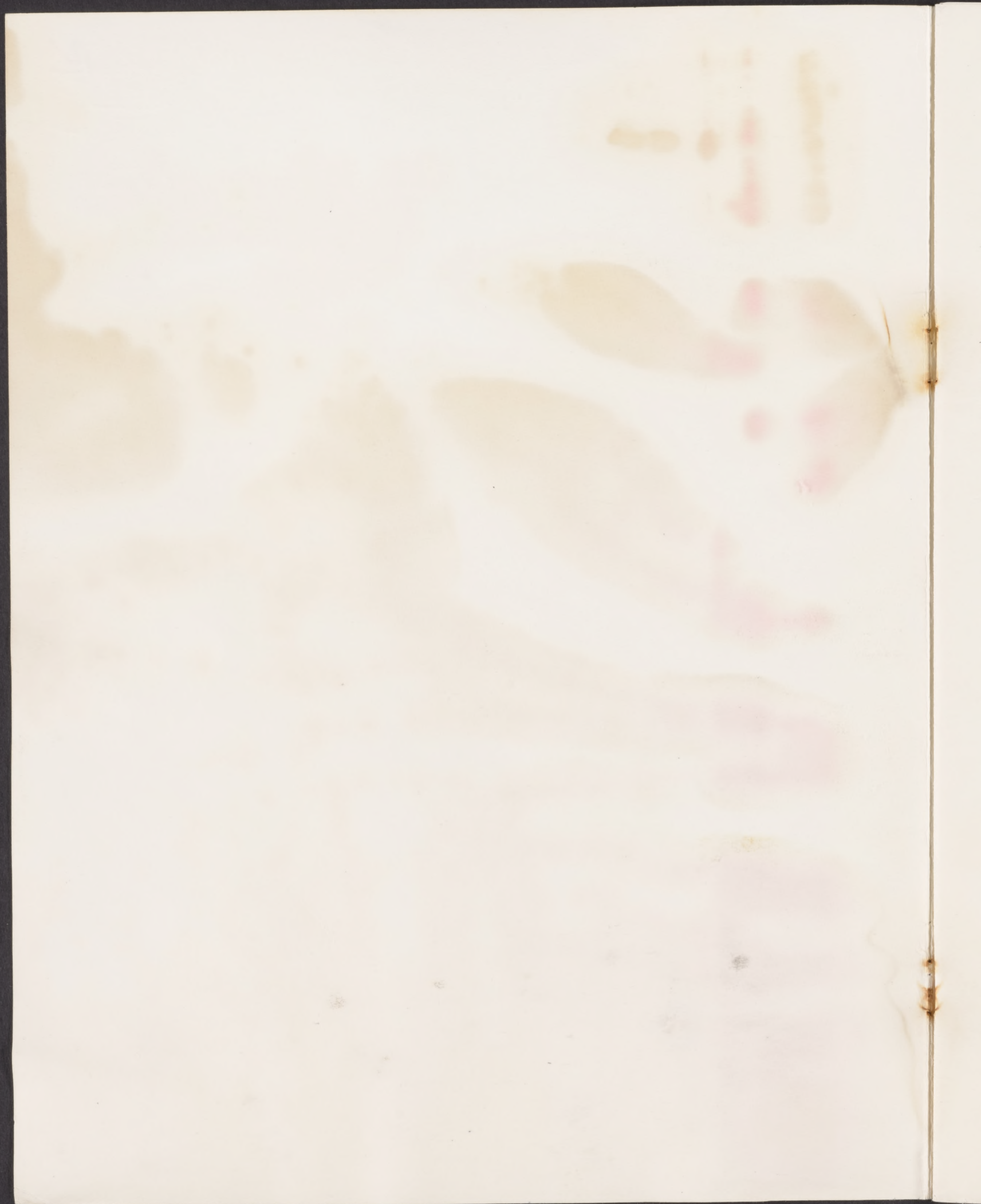
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF CONSERVATION
DIVISION OF FORESTRY

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DIVISION OF FORESTRY
Nevada-Yuba River



the State Forester's 1968 REPORT



RONALD REAGAN
Governor

NORMAN B. LIVERMORE, JR.
*Secretary for Resources
The Resources Agency*

JAMES G. STEARNS
*Director
Department of Conservation*

THE STATE FORESTER'S 1968 REPORT



F. H. RAYMOND
State Forester

THE CALIFORNIA STATE BOARD OF FORESTRY

Whitford B. Carter, Chairman

Paul Aurignac

Leslie O. Cody

Philip Abrams

Ray Crane

Kelly B. McGuire

Howard K. Nakae

SACRAMENTO, CALIFORNIA
1969

RONALD KAGAN

Director

JAMES G. STEARNS

Director

Department of Conservation

WOMAN, E. EVERETT JR.

Secretary

Department of Conservation

THE STATE FORESTER'S 1968 REPORT



F. H. JAYBOND

State Forester

THE CALIFORNIA STATE BOARD OF FORESTRY

1001 L Street, Sacramento, California 95833

State Forester
Department of Conservation
Sacramento, California

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1968

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Cover: Japanese ships loading forest products at Sacramento-Yolo Port District.—Photo courtesy of Cartwright Aerial Surveys, Inc., Sacramento.


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graph TD
    DC[DIRECTOR  
DEPARTMENT OF CONSERVATION] -.-> SBF[STATE BOARD OF FORESTRY  
(7 members appointed by the Governor -  
Overlapping terms.)]
    DC --> PF[PLANNING]
    DC --> SF[STATE FORESTER]
    SF --> CDSF[CHIEF DEPUTY STATE FORESTER]
    CDSF --> PAC[POLICY AND PROCEDURE COORDINATION]
    PAC --> FCS[FIRE CONTROL  
Hdqrs. Shop]
    PAC --> RMC[RESOURCE MANAGEMENT  
Hdqrs. Nursery]
    PAC --> FIP[FIRE PREVENTION]
    CDSF --> FIA[FIRE ACADEMY]
    CDSF --> T[TRAINING]
    CDSF --> MS[MANAGEMENT SERVICES]
    CDSF --> ECC[ENGINEERING &  
CONSERVATION CAMPS]
    CDSF --> DSD[District Deputy & Staff]
    DSD --> D1[1]
    DSD --> D2[2]
    DSD --> D3[3]
    DSD --> D4[4]
    DSD --> D5[5]
    DSD --> D6[6]
    D1 --> RU1[5 Ranger Units]
    D1 --> CC1[7 Conservation Camps]
    D1 --> SF1[3 State Forests]
    D2 --> RU2[5 Ranger Units]
    D2 --> CC2[6 Conservation Camps]
    D2 --> SF2[2 State Forests]
    D2 --> N2[Nursery]
    D3 --> RU3[6 Ranger Units]
    D3 --> CC3[5 Conservation Camps]
    D3 --> SF3[1 State Forest]
    D4 --> RU4[6 Ranger Units]
    D4 --> CC4[4 Conservation Camps]
    D4 --> SF4[1 State Forest]
    D5 --> RU5[6 Ranger Units]
    D5 --> CC5[3 Conservation Camps]
    D5 --> SF5[1 State Forest]
    D5 --> N5[Nursery]
    D6 --> RU6[4 Ranger Units]
    D6 --> CC6[7 Conservation Camps]
    D6 --> JCC[Job Corps Center]
    D6 --> NF6[8 STATE FORESTS]
    D6 --> FDC[6 FIELD DISTRICTS]
    D6 --> RUC[32 RANGER UNITS]
    D6 --> CCC[33 CONSERVATION CAMPS]
    D6 --> JCC2[1 JOB CORPS CENTER]
    D6 --> FN[2 FOREST NURSERIES]
  
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The organizational chart for the Department of Conservation, State of Oregon, is structured as follows:

- DIRECTOR, DEPARTMENT OF CONSERVATION**
 - STATE BOARD OF FORESTRY** (7 members appointed by the Governor - Overlapping terms.)
 - PLANNING**
 - STATE FORESTER**
 - CHIEF DEPUTY STATE FORESTER**
 - POLICY AND PROCEDURE COORDINATION**
 - FIRE CONTROL** (Hdqrs. Shop)
 - RESOURCE MANAGEMENT** (Hdqrs. Nursery)
 - FIRE PREVENTION**
 - FIRE ACADEMY**
 - TRAINING**
 - MANAGEMENT SERVICES**
 - ENGINEERING & CONSERVATION CAMPS**
 - District Deputy & Staff** (6 districts)
 - District 1:** 5 Ranger Units, 7 Conservation Camps, 3 State Forests
 - District 2:** 5 Ranger Units, 6 Conservation Camps, 2 State Forests, Nursery
 - District 3:** 6 Ranger Units, 5 Conservation Camps, 1 State Forest
 - District 4:** 6 Ranger Units, 4 Conservation Camps, 1 State Forest
 - District 5:** 6 Ranger Units, 3 Conservation Camps, 1 State Forest, Nursery
 - District 6:** 4 Ranger Units, 7 Conservation Camps, Job Corps Center, 8 STATE FORESTS, 6 FIELD DISTRICTS, 32 RANGER UNITS, 33 CONSERVATION CAMPS, 1 JOB CORPS CENTER, 2 FOREST NURSERIES



APPROVED:

STATE FORESTER:

Diagram

THE STATE BOARD OF FORESTRY

The State Board of Forestry is a policy-making board of seven members, appointed by the Governor. It represents interests of the people of the State of California in acquiring and managing lands as state forests, and in federal land matters concerned with forestry. This Board also is responsible for protecting the state's interest in forest resources in private ownership. The Board develops and maintains an adequate forest policy, and establishes general policies for guidance in administration of the Division of Forestry.

The Board held eleven regular meetings in 1968, in ten different months. In addition to regular meetings, various members assisted in work of timber maturity boards for determining timber maturity on cut-over lands. They also attended committee meetings, hearings, and other activities concerned with conservation, protection, and development of natural resources of the state.

Early in 1968 a comprehensive review of Division of Forestry programs in fire control, engineering and conservation camps, and forest and fire research was completed. Board policies for all active programs of the Division were revised as needed to bring them up to date. The Board reviewed development of the Division of Forestry budget, as well as budgeting processes from origin of a budget request through screening and legislative decision to approval by the Governor.

Attention of the Board was given to proposed legislation intended to substantially modify a number of provisions of the Forest Practice Act; the legislation was held in abeyance, pending further study of the need for it. Public hearings were held, and amendments adopted to the Forest Practice Rules of both the South Sierra Forest District and the Coast Range Pine and Fir Forest District. The Board held hearings at various meetings during the year, and approved a total of twenty alternate plans and three amendments, for improved performance in timber harvesting and reforestation on privately owned forest lands. Construction of Cuesta Fuel Break, an operation in San Luis Obispo County involving both the Division of Forestry and the U. S. Forest Service, was supported by resolution in June; after a hiatus of nearly three years because of local objections to the fuel-break including a small part of a Sargent cypress grove, work was resumed in June and brought to completion in November.

An item of continuing concern throughout the year was export of logs to foreign markets, especially in Japan. Log exports from California rose from 13 million board feet in 1961 to 43 million feet in 1967, and an estimated 200 million feet in 1968. Increased exports, due principally to a housing boom in Japan, strongly affected domestic markets, leading to need

for study and action on several policy questions by the Board of Forestry. In April an export quota of 350 million board feet of logs was set by the federal government for federal lands in coastal Oregon and Washington. It led quickly to increased exports from California and other areas without quotas. Timber industry leaders sought extension of the quota to California. The Board of Forestry supported this position by resolution, as did the California Legislature. The export quota of 350 million board feet of logs finally was extended to all federal lands west of the 100th meridian, for a three-year period, by amendment to the Foreign Aid Bill. A bill was introduced in the Legislature to prohibit export of timber from State Forests. Due to legal problems, and the fact State Forests are not in areas of heavy demand for export timber, the bill did not emerge from committee.

Due to economic pressures of the log export situation, the Board also adopted as an emergency measure new regulations affecting performance under permits for conversion of forest lands to nonforest uses.

Efficient, effective performance of its functions presumes an intimate knowledge of wildland conditions and conservation matters on the part of members of the Board of Forestry. To keep currently informed the Board takes a number of field trips each year as an integral part of its regular meetings.

Preceding the June meeting in San Luis Obispo, the Board visited areas in San Luis Obispo County where they acquired first-hand knowledge of range conditions and range improvement field studies; development of recreational facilities—and attendant problems—connected with water projects; and the status and need for fire protection of range, watershed, and urban areas, including a visit to the grove of Sargent cypress which figured in the controversy about location of the Cuesta Fuel Break.

Following the August meeting in Eureka, members of the Board saw second-growth stands and logging operations where merchantable timber is being removed selectively; visited the area where an alternate plan approved by the Board is being put into effect; and viewed some 25 million board feet of logs, sorted and decked for export at Fields Landing, where active ship-loading operations were in progress. These field trips provide Board members with indispensable knowledge and the actual "feel" of forestry, range, and watershed conditions.

There was one change in membership of the Board in 1968: Howard K. Nakae was appointed to replace Frank C. Myers who had served two terms on the Board. During the years he served, Mr. Myers was faithful in attendance at Board meetings, and participated actively in its affairs, serving as Vice Chairman during the last part of his term.

EXECUTIVE

The Year in Review

The threat of an extremely critical fire season during the summer of 1968 caused the Governor to issue an emergency proclamation declaring that a serious forest fire potential existed. Providing means to cope with the great danger facing the state was the responsibility of Director of Conservation Stearns and State Forester Raymond. In addition to a special alert to field forces and cooperators, they decided to increase effectiveness of striking forces by adding fire fighters to the crew of each firetruck to bring it to full strength. The monumental task of recruiting several hundred emergency fire fighters and moving them into the field was accomplished in record time. Proof of the effectiveness of these and other efforts is measured by the fact that although 1968 had the highest incidence on record, the acreage actually burned is below normal by more than 20 percent.

State Forester Raymond continued to be active on the C-M 2 Study Committee of the National Association of State Foresters. Meetings were held in Washington, D. C., and Wisconsin to develop guidelines for determining values related to potential loss of all resources involved in forest fires. He also participated as chairman of the Forest Fire Committee of the Western Forestry and Conservation Association, and as vice chairman of the California-Nevada Forest Fire Council.

Considerable time and attention were devoted by the State Forester, Chief Deputy, and many staff members to hearings conducted by Assemblywoman Pauline Davis concerning fire control policies of the Division.

Chief Deputy Moran participated in the ceremony in which the Medal of Valor was presented to Division of Forestry employee Joe Haggard. He also presented a fire prevention award to the Saratoga Junior Women's Club for developing the best fire prevention education program for elementary school children.

One of the major conservation efforts of recent years culminated with establishment of a Redwood National Park late in 1968. Several professional foresters on the staff of the State Forester, with long experience in the redwood forest region, contributed materially to this effort. They were called upon for evaluation of the several proposals for the Redwood National Park, for appraisals of the quality of the lands involved, for impact studies of effect of the proposed park on the local economy, and for other expert professional services preliminary to final success in assigning National Park status to a portion of the world-famous redwoods.

Training Activities

The California Division of Forestry Fire Academy at Ione completed its first year of operation. The resident staff of 14 was assisted by specialists, from a variety of sources. Significant contribution to Academy courses was provided by instructors from other units of the Division of Forestry—State Forester's Headquarters staff, District Offices, Ranger Units, and Conservation Camps, by other organizations, and by industry.

Highlights of activities for the year ending June 30, 1968, include five standard five-week Basic Fire Control courses (formerly referred to as "Driver" courses)—a total of 2,750 man-days of instruction; one Forestry Equipment Operator (FEO) School, 825 man-days; Equipment Maintenance Foreman School, 190 man-days; Explosives, 125 man-days; "Plans" training, 190 man-days; Liquid Petroleum Gas appliance use and maintenance, 140 man-days; Law Enforcement, 1,760 man-days; Air Coordinator, 96 man-days; and four newly-developed classes to provide concentrated training to 75 "seasonal Drivers," 750 man-days—a grand total of 6,826 man-days of training at the Fire Academy.



Students in full turn-out gear, put their theories and knowledge to work in suppressing an oil fire with fog; a training exercise at the Fire Academy.

The field portion of the "FEO" training produced 2.8 miles of high quality truck trail at the Camanche Reservoir Field Training Site, later used for training "Drivers" on dirt roads typical of "truck trails" throughout much of California's foothill and mountain area. Progress was made in developing the Field Fire Area.



A factory representative instructs a class of Equipment Maintenance Foremen on heavy duty brake systems for trucks, at the Fire Academy.

The Fire Academy staff accepted the job training previously given by Districts for "late hires" or "seasonal" Drivers. Four 10-day sessions were organized to give training in vehicle use and operation for these "new" Drivers. One class was started on June 17 to accommodate 21 students just out of college classes. Seventy-five students participated in this concentrated program, relieving the Field of the need to conduct "spring training" on top of an already crowded schedule.

The Training Committee, during the year, developed and prepared training needs to meet criteria for employee development standards for all classes. Standard courses to provide uniform training throughout the organization were approved, and will be developed in the Plans function in large fire management; Small Fire Management; Extended Attack Fire Management; Maintenance and Service of LPG Appliances; Vehicle Maintenance; and others. In all, it was a year of major accomplishments toward standardized training materials and procedures. In subjects where instruction can be conducted best in the field it is planned to present the materials first at the Fire Academy to selected students who will then become field instructors in their Units. Standardized "Instructor Packages" will be available as necessary, to permit qualified employees, with little additional effort, to offer effective training in courses included in this project of standardization.

At year's end, a study of the Basic Fire Control training program in relation to changing needs of the field organization was being planned. Forest Fire Trucks now are equipped with ladders; it will necessitate training in their use and care. A study will show any other changes needed to produce the best possible use of the training program.

Planning and Coordination

Systems—their description and analysis—were the focal point for much of the planning effort in the Division of Forestry in 1968.

The advent of the Programming and Budgeting System (PABS) led to considerable work in description, analysis, and justification of all operating programs for program budgeting purposes. Problems inherent in coordinating planning, operations, and budgeting were analyzed and attacked. Methods of evaluating and correcting the Program Time Reporting System (PTRS) were developed.

Work continued on Fire Information Reporting System (FIRES). This data gathering system is basic to planning and operating the fire prevention and fire control programs.

Considerable work was done on theoretical problems in economics of fire protection, in response to national studies and for internal use. Interagency coordination of the development of planning and economic theory, development of models, and operation research techniques is a large task in analysis of fire protection systems with their various legal, practical, and financial restraints.

Some work on coordinate systems for mapping and planning purposes was begun.

A timber marketing and utilization study for the North-Cal Neva Resource Conservation and Development Project in Modoc County was authorized. This project is an attempt to improve use of natural and human resources of a rural area in California with depressed economic conditions.

Several proposals for classification of lands under the federal Wilderness Act were analyzed.

The planning coordinator served on several interagency groups including a committee to coordinate operation of the new Oroville Dam and Reservoir; study groups regarding the transportation plan for the proposed Auburn Dam; a team working on a study of Protected Waterways in California; and coordinating studies with the Bureau of Land Management.

The law creating a Redwood National Park of 58,000 acres in Del Norte and Humboldt counties was signed on October 2, 1968. This brought to a conclusion several years of studies, reports, economic analysis, and data gathering activities in which the planning coordinator had participated. Negotiations concerning fire protection for the Park, trades of State Park land, and administrative matters continue.

Proposed legislation and studies on open space, environmental quality, solid waste disposal, property taxation, Lake Tahoe, recreation funding, forest prac-

tice administration, protected waterways, and similar subjects were analyzed to determine their effect on forestry in California, on operations of the Division, and responsibilities of the State Forester.

A course in "Remote Sensing of Earth's Resources" was presented to Sacramento Staff personnel.

Safety and Accident Prevention

The fundamental purpose of the accident prevention program is to develop an organization to: Protect life and physical well-being of employees and members of the public; and prevent damage to both private and state property.

The Division has emphasized that the chain of command has responsibility for safe operations. Basically the program depends on interest and action by first line supervisors; they have directed much effort toward building positive attitudes among middle and first line supervisors. Positive attitudes are built on the facts that accidents are caused by unsafe actions and conditions; that they can be prevented by efficient use of men and facilities.

Next to attitudes in importance is training, so employees know how to work properly as well as safely. The new Fire Academy, with its accommodations and competent instructors, has been a valuable asset in furthering accident prevention. Besides training truck drivers and foremen to operate trucks and apparatus properly, they are instilled with their responsibility for using safety procedures in managing fire crews. Specialized training at the Academy has included handling and using explosives, and installing and maintaining liquefied petroleum systems, to reduce the potential for injuries in performing these high risk tasks.

A primary purpose of the Equipment Development Advisory Committee is to develop safer, more effective equipment. The Safety Coordinator attends committee meetings to recommend incorporation of safety features at the initial stages of development.

Operating emergency equipment is hazardous under the best of conditions. The Division has found that if injuries and property damage from vehicle accidents are to be prevented, three areas of vehicle operation need attention: backing procedures; safe parking techniques; and speed, especially when responding to an emergency call.

The Division is sponsoring changes in the retirement program for fire-fighting classes, to reduce injuries among older employees. A pilot program is in operation to assist handicapped employees back to full employment, either in state service or private industry.

Comparison of lost time injuries during the past few years shows the Division is making progress (table). This is particularly significant in view of the fact that last year was one of the worst fire seasons on record.

Lost Time Accidents in the Division of Forestry

	1966	1967	1968
Sacramento Administration	7	6	7
North Coast District	66	66	45
Sierra Cascade District	30	33	27
Central Sierra District	39	36	28
San Joaquin District	56	42	29
Central Coast District	51	49	32
Southern California District	67	70	97
Totals	316	302	265

Many incidental accident prevention programs are being started, or contemplated for the near future: protective equipment to reduce eye, hand, and foot injuries; pre-employment physical examinations to prevent employing physically handicapped persons; physical conditioning to maintain a physically fit, effective fire fighting force; medical standards for determining whether employees are physically able to do arduous work.

These efforts should help prevent accidents and lower the injury rate.

FIRE CONTROL

Primary program objectives of fire control are to prevent and control forest fires on lands of statewide interest, to hold damages at a level where the flow of economic goods and social benefits from the wildlands will not be impaired. Principal program responsibilities are to design and operate a system to attack and control fires; fire control planning and operations; and civil defense and other emergency operations, including statewide dispatching of forces.

Fire Control Section

The State Forester has delegated staff authority for the fire control program to a section in his office

known as the "Fire Control Section." The section is headed by a Deputy State Forester who reports to the Chief Deputy State Forester. Responsibilities of the section include fire control operations and planning; equipment management; communications; operational research and development; and air operations.

This staff organization gathers and analyzes information; prepares statements of objectives, policies, and plans; develops standards; and coordinates statewide programs delegated to the section. Responsibilities include field review, inspection, and evaluation of operational plans and activities. This section also coordinates cooperative programs with state, federal,

and local agencies. Section representatives work with District personnel to conduct inspections and provide technical advice and services for programs for which they are responsible. Communications of statewide import are answered by the section; those concerning local matters are referred to the proper District for reply. The section is responsible for lateral communications and cooperative action with other staff sections about matters of common interest or responsibility.

Weather and Forest Fires in 1968

Weather conditions preceding the 1968 season were anything but favorable. Starting with February each spring month was warmer and drier than the preceding, as moisture deficiency became greater. April was almost rainless in much of the State, and also brought persistent winds to dry up the already deficient surface moisture. By May first the seasonal snowpack had disappeared; grass in the foothill areas had begun to cure. Fire season was declared throughout the state by May 1, a relatively early date.

May was nearly normal as regards temperature, but still another dry month. June and July continued the pattern of warm dry weather. By the end of July accumulated fire weather severity was running a whole month ahead of normal in most areas.

Recognizing the fire severity in both number of man-caused forest fires and acreage burned up to the first part of July, the following steps were taken to meet this threat:

1. On July 11th Governor Reagan issued a State-wide Forest Fire State of Emergency Proclamation.
2. The California Division of Forestry and the U. S. Forest Service contacted all organizations who had given us fire prevention and suppression support in the past. They were requested to review their readiness for the remainder of the fire season.
3. On July 18th, the California State Board of Forestry endorsed action taken by the California Division of Forestry and U. S. Forest Service to meet the fire threat.

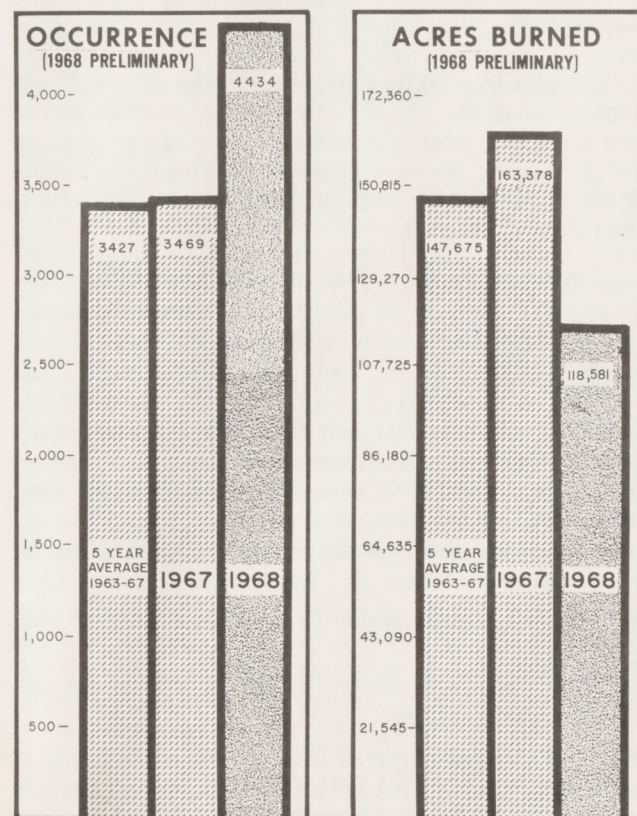
August began hot and dry; but the pattern was soon broken by a weather occurrence of major proportions. An intense trough of low pressure established itself along the Pacific coast and persisted for almost two weeks. This deep, cold trough had a major effect on all the state north of the latitude of Fresno. By the time the normal weather was restored in the last few days of the month, many anomalies had been added to the records: temperatures at some northern lookouts as much as 40 degrees below normal; four to six inches of rain in the northern Sierra and all the northern mountains of the state; the wettest August

on record at Eureka; twenty inches of snow on Mt. Lassen; a cloudburst near Tracy; and many more.

Unfortunately the onset of this cold trough was preceded by a widespread rash of lightning, concentrated mainly in Humboldt, Mendocino, and Trinity Counties. Over 225 lightning fires were recorded on Division of Forestry protection area from the 7th through the 11th of August. This was the most damaging weather occurrence of the fire season within our responsibility area.

September and early October were again hot and dry. Fire weather severity in much of the State remained well above normal, although many of the timber areas benefitted from the rains of August. By mid-October rain began to occur in such quantity that the fire season was ended in the northern Districts. The last District to close fire season was Southern California, on December 20.

Fire weather severity is monitored throughout the state by sampling in twelve "fire danger rating areas." An average of these sample areas showed that for the period June through October, fire weather severity for 1968 was seventh out of the past ten years; 1961



Forest fire occurrence and area burned in State Responsibility Areas, in zones 1 and 2, under direct protection of California Division of Forestry (five-year means indexed to each other). Forest fire occurrence was the highest on record; area burned was 19 percent below the five-year average.

was the most severe and 1963 the least severe. However, in 1968 two of the sample areas—Clear Lake-Berryessa and South Santa Clara Valley—reached all-time record peaks of severity.

During 1968, the Division responded to 4,434 fires that burned wildland fuels. In addition, there were 2,708 fires which did not burn wildlands fuels, but were confined to structures, vehicles, or refuse; in many cases they are potential forest fires, if not quickly extinguished. Thus, the Division responded to a total of 7,142 fires within state responsibility areas during 1968, according to preliminary reports. The comparable figure for 1967 was 6,040 fires, while the five-year average is 5,881 fires.

The 4,434 forest fires—those that burned in wildland fuels—in 1968 is the highest occurrence on record for areas protected by the Division. Some additional statistics on fires due to various causes are given in the table.

Principal "Causes" of Fires in 1968

"Miscellaneous"	1,357
Incendiary	805
Machine use	712
Smoker	588
Debris burning	453
Lightning	400
Camper	100

The area burned in 1968 was 118,581 acres—27 per cent less than the 163,378 acres burned in 1967; and 19 per cent less than the current five-year average of 147,675 acres. Some comparative information about acreages burned by fires of different size is given in the table.

Acreage Burned by Fires of Various Size Classes

Size class	1967	1968	Difference
300-1,000 acres	14,981	29,500	+97%
1,000-5,000 acres	23,329	40,300	+73%
Larger than 5,000	103,134	19,100	-81%

During the year 77 major fires (300 acres or larger) occurred in our area of responsibility; they burned 88,900 acres. In 1967 there were only 45 major fires, which burned 141,444 acres.

In summary, the 1968 fire season was highlighted by many unusual items—

- The fire season began several weeks earlier than usual
- Fire occurrence: the highest on record—about one-third *above* normal
- Acreage burned: about 22 per cent *below* normal—fourth lowest in the past ten years
- A large number of major fires—300 acres and larger
- A severe lightning storm in the northern part of the state on August 8—caused 225 fires
- Burning permits cancelled twice in northern California, because of strong, drying, northerly winds

- A large number of persons suffered injuries from burns on fires—fortunately there were no fatalities
- An extended fire season in southern California

Fire Control Organization

In 1968 the Division of Forestry operated with the following ground attack organization:

Forest Fire Stations	235
Bulldozer Transport Units	58
Fire Trucks	371

Final budget discussions resulted in crew size being reduced at five forest fire stations. The stations which were reduced from a No. 3 (10-man) to a No. 2 (9-man) station are: Transfer Point, Badger, Gustine, La Panza, and Las Tablas. Five fire trucks were deleted as a result of this reduction.

On July 11, 1968, Governor Reagan signed an Emergency Proclamation which recognized the serious wildland fire potential and permitted the hiring of some 500 additional firefighters—primarily disadvantaged youths—to meet the acute fire problem. The Division of Forestry and the Department of Employment worked out a hiring plan, through local employment offices and the several Youth Opportunity Centers in the major cities. Though the Division was unable to reach the peak strength anticipated, it is estimated during the critical months of August, September, and part of October, 400 additional firefighters were effectively employed. Thus, for the first time the Division was close to full "Fire Plan" strength in firefighters.

The 1968-69 fiscal year budget included additional Cook personnel. This augmentation replaced a portion of those lost during 1967, as a result of economy measures.

The total number of lookouts remains at 77. Mathison Lookout, in Mendocino Ranger Unit, was manned in place of Round Top Lookout, in Santa Clara Ranger Unit, which had been closed due to its limited effectiveness. In 1967 Mathison Lookout was closed because of budget reductions.

During the 1968 fire season the Fire Control Handbook was adopted as the current operational Handbook for fire-going personnel. This Handbook serves both as a ready reference and a work tool on the fire line and in fire camp.

With the severity of the early June fire season in central and southern California a need for air tankers was created in advance of the regular contract period and prior to the annual CDF-USFS preseason aircraft inspection. Through close cooperation of operators and agencies, inspections were completed and aircraft placed in operation at almost the full level of service during this time of need.

Training of personnel connected with the air program was intensified, starting in May with a one week course for Air Coordinators at the Fire Academy; and continuing through the entire month of June with new pilot training, and refresher courses for pilots and operators having prior experience. Most of the training programs were developed and presented cooperatively with the Forest Service.

During the early spring one of the larger airtanker contractors, who had nine airtankers, went out of business. Through negotiations between the agencies and the remaining four operators, equipment was acquired and new contracts negotiated to fill the Division needs at bases which had been vacated. The airtanker program remained at the same level as 1967, with the Division contracting for 21 airtankers and the Forest Service for 16 which were distributed among the 20 airtanker bases in California.

Aircraft use was very high during the months of June and July. It was not unusual to have two-thirds or more of the fleet flying on a number of fires at any one time. This extremely heavy use demanded a level of maintenance that had not been experienced before. Added to a number of unplanned engine changes because of premature failure, available maintenance personnel were taxed to their limits. Although replacement engines and certain parts for the aircraft we are using are in short supply few planes were out of service for more than one day.

The airtanker base improvement program started several years ago was almost completed during the spring period. The remaining work will be finished this coming winter. Preliminary work was begun to develop an airtanker base at the Chico Municipal Airport, to replace the Red Bluff and Oroville airbases. A lease has been negotiated and building will be done during the winter, so the base can be occupied at the start of the 1969 fire season.

Contracted Fire Protection

The counties of Kern, Los Angeles, Marin, Santa Barbara and Ventura have effective, hard-hitting county fire departments. In recognition of the efficiency of these fire departments, the Division contracts with them for the fire protection of 4.2 million acres of State Responsibility Areas. The 1968-69 Fiscal Year budget for protection of these lands is approximately 2.6 million dollars. Each year, on-the-ground review of each contract, with the county fire chiefs, is attended by District Headquarters and the State Forester's Headquarters staff. The annual meeting of the Contract County Fire Chiefs with Division administrative personnel was held in Monterey during July. Mutual problems are discussed at these meetings.

During the 1968 fire season, substantial assistance was provided to Contract Counties for extended attack, and major and campaign fire situations, in areas

of state responsibility. This assistance was primarily conservation camp crews and aircraft.

This year two kitchen trailers are being built for the Los Angeles County Fire Department, on a cost reimbursement agreement. Twenty-four of these trailers are in use in the field; they enhance greatly the logistical support of fire suppression forces.

During 1968 contracts were continued with 26 counties, to provide fire protection to lands of local government responsibility. These contracts provide for specific levels of protection, depending on desires of the local agencies. The cooperative program, for which the state is fully reimbursed, is supported by the legislature. This integrated fire protection program has proved to be effective and economical for local governments and increases the flexibility and utilization of manpower of the Division.

Reimbursable services for contracted local fire protection for the 1968-69 fiscal year were 6.2 million dollars. The Fire Protection Contracts Liaison Officer in the Fire Control Section of the State Forester's Office maintains contact with the office of the State Fire Marshal, Pacific Fire Rating Bureau, and California Disaster Office. District and Ranger Unit administrators meet frequently with county boards of supervisors and planning commissions, county administrative officers, and other county officials concerning fire protection and other emergency situations.

Cooperation

In 1968 close working relationships were continued with the U. S. Forest Service. As organizations with interrelated fire problems throughout the state, close cooperation and liaison are essential. Joint management of large fires was carried on in a number of cases in 1968. Conservation camp crews were used by the Forest Service on almost all of the eighteen national forests this year. A good example of cooperative fire protection between the Division, U. S. Forest Service, and Contract Counties is the Liebre Fire in June 1968, which burned in both the Angeles National Forest and the State Responsibility Area of Los Angeles County that the county protects under contract with the State. Total was 50,800 acres; total manpower on the fire was 1,300 men. The Division assisted with 14 conservation camp crews of 15 men each; 379 emergency firefighters from state institutions; 25 overhead; and two airtankers.

The state contracts with the Forest Service for protection of approximately 5.2 million acres of state and private land located inside national forest boundaries. This contract is for 52 fire crews, 20 lookouts, and 11 patrolmen. Inspections of personnel, equipment, and training were made by Division and Forest Service personnel on all but one forest this year.

A Division representative attended the U. S. Forest Service Advanced Fire Management Training Course

at the National Training Center, Marana, Arizona. Another representative participated in the National Retardant Seminar at the Riverside Forest Fire Laboratory. San Bernardino Ranger Unit cooperated with the Riverside Fire Laboratory in testing computerized dispatching.

The Chief Deputy and the Deputy in charge of Fire Control attended the Western Forest Fire Conference in Portland, June 3 and 4, 1968. Objectives of the Conference were to explore western fire control problems, and develop recommendations for programs designed to strengthen fire control management.

A member of the Division was Chairman of the Program Committee for the Western Forestry and Conservation Association meeting held December 4 thru 6, 1968, in San Francisco. Objectives of this organization are to consider and act on pertinent forest conservation problems common to the western U. S. and western Canada.

Water Project Fire Protection Planning

Watershed fire protection planning efforts were continued on two Type IV river basin studies*: the North Coast Study, and the Central Lahontan Study on the east side of the Sierra Nevada. These studies are in cooperation with both federal and state agencies. Installation of land treatment measures on the Escondido Creek Project in San Diego County is continuing under Public Law 566.

Fire protection services on the San Luis Reservoir Project in Madera Ranger Unit, provided under contract with the Bureau of Reclamation, were terminated October 14, 1968. Fire protection services continue on the Bullards Bar project, on a cooperative basis with Yuba County Water Agency.

During 1968 fire protection needs on numerous reservoir projects were planned in cooperation with federal, state, and local agencies participating in water development: U. S. Army Corps of Engineers, Bureau of Reclamation, U. S. Department of Agriculture, State Department of Water Resources, flood control districts, and municipal water districts. Participation involved review of Division of Forestry interest, preparation of fire plan if needed, and recommendations to wildland managers when applicable.

In February the Division began participation in the California Region Comprehensive Framework River Basin Studies. This work is funded by contract with the state Department of Water Resources from a federal grant to the state for participation in the Comprehensive River Basin Framework Studies authorized under Title III of the Water Resources Planning Act (Public Law 89-80). California is one of eighteen Re-

* Type IV river basin studies are comprehensive plans developed under Section 6 of Public Law 566, for purposes of (1) flood prevention, or (2) conservation development, utilization, and disposal of water, and thereby protecting the nation's land and water resources. The federal government cooperates with states and their political subdivisions, soil and water conservation districts, flood prevention and control districts, and other local public agencies in carrying out this program.

gions into which the United States has been divided for this national program of studies of water and related land resources (also called Type I studies). These studies are done under guidelines of the Federal Water Resources Council. The framework studies will develop comprehensive plans to provide "economic projections of economic development, translation of such projections into demands for water and related land resource uses, hydrologic projections of water availability both as to quantity and quality, and projections of related land resource availability, so as to outline the characteristics of projected water and related land resources problems and the general approaches that appear appropriate for their solution."*

The Division is concerned mainly with watershed management and land resources on state and private lands. In addition, the Division representative helps supply data and information. It is expected that this participation will play a major role in assuring Division of Forestry objectives and interests are considered in the final plan.

During 1968 a major effort was made to gather basic inventory data and information. A region-wide vegetation cover map was developed. Information from this map, together with that on land ownership, soil associations, land use, county areas, and land resources areas has been coded for automatic data processing to produce regional and sub-regional tabulations of acreages by various classifications of the above categories.

A major study, now nearly complete, is developing a body of fire statistics for all wildlands in the region for the period 1960-65. Data from all wildland protection agencies for fires of ten acres and larger are being used. One difficulty has been the need for cross-checking statistics from different agencies to eliminate duplicate reports of acreage and damage. Considerable work has been contributed also to the Present Land Use Mapping Project. Efforts now are being directed towards analysis of county and urban planning studies to produce land use statistics projected to the year 2020.

Communications

Purchasing new radio equipment was begun early in 1968, to implement earlier plans. Units were ordered to accomplish the following:

- Complete the microwave systems in the Central Sierra, San Joaquin, and Central Coast districts, so all Ranger Units in these districts will have the air net intercom system and the "green phone" system to aid fire dispatching.
- Add three air net remote controlled base stations, to complete the air net system in the Sierra Cascade District.

* "Pacific Southwest Compendium of Framework Planning Policies," prepared by the Coordinated Planning Subcommittee of the Pacific Southwest Interagency Committee.

- Expand state net coverage by adding five additional mobile relays (plus three replacements).
- Add four airport base stations on Division frequencies and seven airport base stations on the Unicom frequency. This completes purchase of radios for all air tanker bases.

A few miscellaneous items—such as small replacement fire station radios—were ordered also. It is planned to install all equipment ordered before the 1969 fire season.

Communications activity for 1968 centered around planning a major change in the radio system to satisfy fire control communication needs for the next five to ten years. Funds were budgeted to begin this change during the 1968–69 fiscal year; it will span a five-year period, at a cost of \$500,000 to \$600,000 each year. Approximately half the cost will be for replacing existing obsolete equipment. At present about 3,000 pieces of VHF communications equipment are in use, and some 1,600 of them are more than ten years old.

Briefly, radio system changes planned are as follows:

- Add radio coverage to the existing state net radio system, and change the state net system from a 3-tone to a 5-tone mobile relay actuated system.
- Change district radio nets to a 5-tone single frequency actuated system, freeing radio frequencies for other uses. At present, district radio net mobile relays are actuated by two radio frequencies per district.
- Assign local radio nets to individual Ranger Units, to the extent that frequencies are available; some adjacent ranger units will have to share a local net frequency.
- Change the air net from a single frequency system to a 3-frequency system; purchase new radio equipment for 37 aerial tankers and 20 "Airco" aircraft.
- Establish a separate frequency for Handie-Talkie radios, to eliminate interference to Handie-Talkie communications from high-powered mountaintop mobile relays. It also will provide a common statewide frequency for use by fire control forces on foot along the fire perimeter.

It is planned also to test small inexpensive "citizen's band" hand-held radio equipment for use in large scale fire control operations.

Equipment Management and Development

Effective management of a highly diversified fleet of automotive and heavy equipment operated by the division is of utmost importance to the efficiency of operations. Proper operation, timely maintenance, and repair continue to be stressed. Training for drivers, foremen, and forestry equipment operators has been

improved since facilities of the Fire Academy became available.

Minimum qualifications for new employees in the Forestry Equipment Operator classification now require some basic mechanical background. To assist their in-service training a five-day "cram course" in tuneup is offered at the Academy. The course, confined to fundamentals of electric systems and carburetion of gasoline-powered equipment, is commensurate with Personnel Board recognition of Forestry Equipment Operators as apprentice mechanics.

The annual five-day training course for Equipment Maintenance Foreman was given at the Fire Academy in February. Thirty-five Equipment Maintenance Foremen and Heavy Equipment Mechanics were in attendance, as well as several retired members of the maintenance organization. Classes were taught exclusively by manufacturers' representatives from all areas of industry.

Of particular interest was a quality control program sponsored by Ford Motor Company. Quality control on the assembly line has a direct relationship to warranty claims in the field. As manufacturers have extended warranty periods to 5 years or 50,000 miles, maintenance personnel have found it necessary to expend much more time in seeking adjustment of claims. Warranty may be as small as replacement of a cigarette lighter or as important as replacement of engines and other major components. One change in 1968 cost the manufacturer more than \$2,500 for each of 49 vehicles.

Equipment Maintenance Foremen, with assistance of Division Headquarters personnel, have completed training guides on maintenance for their use in day-to-day training of Foremen and Drivers at Fire Control Stations. This training material includes slides, handouts, examinations, and visual aids; it will provide continuity of subject matter throughout the Division of Forestry organization.

During 1968, fires required maximum movement of Forestry equipment within the state. The high level of maintenance is indicated by the facts that buses, firetrucks, transports, and administrative vehicles, responded to, operated on, and returned from the fires with an absolute minimum of down time or mechanical failures.

The newly formed Equipment Development Advisory Committee held several meetings in 1968. The committee reviewed numerous items, and recommended their adoption for statewide use. The most notable of these items are: standardized fire camp furniture, such as boxes and desks; fire camp lighting equipment; fire camp generator and power trailer; protective side screens for bulldozers; criteria for fire camp headquarters trailer, and for new style protective helmets.

RESEARCH AND DEVELOPMENT

Research and development make important contributions to effective wildland protection and forest management programs. They provide factual information for understanding the fundamental nature of problems in fire prevention, fire control, and management and development of State Forests and other wildlands. They permit equipment and techniques to be tested under operating conditions, so a balanced judgment can be made as to their value in meeting our needs for improved means of executing management and protection responsibilities.

Research and development needs of the Division are met principally by cooperative activity with agencies and institutions whose primary mission is scientific research, or by direct funding of projects to be conducted by such organizations.

Fire Research

Cooperation with many other government and private agencies in conducting fire research studies was continued in 1968. Funds were contracted to the U. S. Forest Service, Pacific Southwest Forest and Range Experiment Station, for projects related to fireclimate, fire management systems, and fuelbreaks. Money was also contracted to the University of California School of Forestry for a special study on economics of fire protection. In addition, Division personnel conducted several applied research studies on their own, and

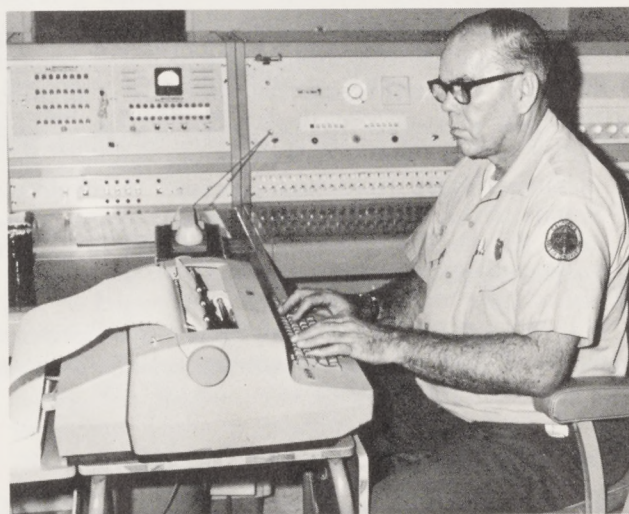


Wind speeds of more than 100 miles an hour are frequently measured on top of Mt. St. Helena, Sonoma County, during fire weather studies. They are typical of winds affecting behavior of large fires.

developed or evaluated several kinds of equipment designed to assist fire control personnel.

The Fireclimate Project completed reports of Santa Ana wind flow in the San Bernardino-Riverside area, and numerical analysis of the convection associated with a valley wind regime. A special study was made of the weather and behavior of the "Loop" fire of 1966, which took the lives of 12 firefighters on Angeles National Forest under extreme weather conditions. Attempts to find meteorological factors which can be correlated and used to predict air stability have been unsuccessful; this important study continues. Personnel connected with the Fireclimate Project are continuing a fuel study of Santa Ana wind characteristics in San Antonio Canyon in the San Gabriel mountains.

The Fire Management Systems Project has been defining components of the fire management system; determining how economics and operations research can improve fire control operations; and developing techniques and methods for implementing various components of the system. Most of the studies are designed to give the fire manager tools to enable him to make decisions more quickly and with a greater probability of success than has been possible in the past when using only intuitive judgment based upon experience and knowledge. Most of the systems use automatic data processing extensively. One system, for example, was designed to assist dispatchers in selecting and sending initial attack units to fires, planning move-up and back-up operations, and providing an inventory of all fire control units and their locations at any stage of the fire control operation. This



Automated fire dispatch system in San Bernardino Ranger Unit headquarters gives dispatcher access to a remotely located computer. Seconds after it receives the fire location the computer indicates crew (or crews) to be dispatched and travel route for each crew.

system gives the dispatcher access to a remotely located computer, enabling him to secure desirable information in a matter of seconds. Other similar systems for making control decisions have been developed to a large extent and are ready for field testing.

A new fire retardant developed by Collier Chemical Company of Los Angeles was tested operationally on forest fires by tankers from the Chino Air Base. A number of difficulties were encountered with the mixing system, making it impossible to complete a full evaluation of the retardant. Further testing will take place in 1969. Drop tests from a helitanker were made during two days of inter-agency cooperative effort to determine optimum viscosity of a retardant for use in helitankers. Study of drop patterns showed that viscosities of 500 to 700 cps. (centipoises) may be optimum for speeds between 25 to 50 knots at heights from 50 to 100 feet. However, it was also determined that viscosities as low as 100 cps. and as high as 1500 cps. were usable in helitankers with the right combination of drop height and speed.

The Fuelbreak Project continued study of various herbicides for controlling regrowth of unwanted shrubby plants and trees on fuelbreaks. Tordon shows considerable promise in helping to control some plants, such as live oak and sumac, which have been difficult to kill with 2,4-D and 2,4,5-T. The search continued for low-growing plants with low fuel volume and, hopefully, low flammability. The Division conducted a phenological and ecological study of Creeping Sage in Lake and Nevada counties. This



Creeping Sage is a candidate for planting on fuelbreaks. It is low growing, has low fuel volume, and remains succulent well into fire season.

plant is a leading candidate for establishment on fuelbreaks. Emphasis was placed on studying the seeding and growth habits of Creeping Sage, and methods of harvesting and planting the seeds. Creeping Sage remained succulent well into the fire season. In early July old growth began to die and lose its moisture content. In late July burning tests were conducted to measure the relative flammability of grass and Creeping Sage: fire spread was four times slower in Creeping Sage than in adjacent grass.

The Economics of Fire Protection Project at the University of California continued to develop mathematical models of air tanker systems, taking into consideration actual fire occurrence and the relative efficiency of different air tanker types, determined by a survey by fire control personnel. The original mathematical model for the north half of California is being extended to the entire state.

Gathering fire intelligence on large fires often has been a slow process when done entirely from the ground. Observation from aircraft can be valuable to the Fire Boss, especially when Polaroid photographs are obtained so that he can obtain a visual picture of fire behavior and problem areas on the fireline. To supplement other tools used to gather fire intelligence, a portable closed-circuit television system, was purchased in 1968. Video tapes have a capacity of 20 minutes of continuous operation, but experience on fires late in 1968 showed these tapes may last for two or more hours of flying time in normal operations. The tape is then returned to the Fire Camp where the Fire Boss and his staff can view it on a playback system. Further evaluation of the television equipment will be made in 1969. In the interim the equipment is being used at the Fire Academy at Ione to assist in training personnel in field exercises. To further assist in its training programs at the Fire Academy, a training simulator developed by the U. S. Forest Service was purchased. This simulator will be valuable for training administrators and line supervisors in decision-making processes of all types.

Several lengths and brands of lightweight plastic or rubber-coated nylon loading hose were purchased for testing at four air tanker bases. While the light weight of the hose was a desirable feature, all brands tested abraded easily and kinked badly in operation. Some 1½-inch Polycarbonate nozzles were tested throughout the state; these lightweight, low cost nozzles were found to have many desirable features compared with traditional brass nozzles. The principal shortcoming was difficulty in adjusting the spray pattern while the water was under high pressure. On the whole the nozzles were received well by fire control personnel. One-inch nozzles of this same material were purchased late in 1968 for evaluation.

During 1968, personnel in the North Coast District developed a trailer-mounted generator plant, to be

tested in the field in 1969. The generator is designed to meet electrical needs of an entire fire camp setup.

The California-Nevada Forest Fire Council held its 1968 Fall meeting in Sacramento on October 16 and 17. It is affiliated with the Western Forest Fire Committee of the Western Forestry and Conservation Association, and with other similar councils in the western states. The purpose of this Council is to provide representatives of forest industry, government forestry agencies, forestry education, and 23 other related activities to advise and stimulate fire research and equipment development. In addition, the Council promotes new or improved methods of fire prevention and control, and provides a forum for discussing fire prevention and control and other matters of mutual interest. The theme of the 1968 meeting was "Creative Solutions to Old Fire Problems." About eighty people attended, including representatives from all of the western Regions of the U. S. Forest Service, and the State of Oregon. Major areas of discussion were: Old Problems and New; Who Provides the Solutions; Fire Prevention, What's New and Needed; Fire Equipment, What's New and Needed; Automating Command and Control of Fire Control; and Where Do We Go From Here.

Fire Prevention Research

Research continued during 1968 with emphasis on child-caused fires. Answers to some fire prevention problems are beginning to help carry out the Fire Prevention program more effectively. The need for research to enable the Division to get the most results out of the Fire Prevention program has never been more apparent than it is today.

An additional year's experience with fire hazard inspections verified major findings of the previous year. Evaluation of results of two years' efforts showed only 49 percent of properties in violation in the spring of 1968, in contrast to 63 percent the previous year. Most improvement was in reduction in number of incinerator violations and in failures to have a burning permit. In many cases personal contact was still found necessary to secure conformance, in spite of the previous year's exposure to the program.

Problems in getting a suitable population of "fire problem children" delayed work on study of child-caused fires being conducted by George Washington University under contract. This is a basic research study designed to probe factors responsible for producing children who become problem fire setters. It is expected that this will also cast some light on etiology of adult pyromania, as well as the more "normal" behavior of children who are involved in accidentally starting fires. The study group has prepared a supplement to the Fire Investigation Report, which should make this report more meaningful in providing data on child-caused fires.

A more applied approach was used in a study conducted by educators at Chico State College. They developed and tested conservation education materials for each grade, kindergarten through third. The materials were used in an experimental situation in public schools in Butte County. Control groups continuing the traditional approach provided comparative data. Data collection was completed at the end of the school year. Analysis is well underway. Preliminary findings indicate that changes in knowledge level as a result of the new approach were considerable.

Analysis of the Wasatch Front Survey, made in Utah, continues. This study duplicates as closely as possible the one done in Butte County, and will provide much needed comparative data from an area similar in terms of the environmental problem, but differing in culture of the people and in extent and nature of fire prevention efforts. A report on a segment of the study was published during the year.

We found that social class was not a significant determinant, but "lower class" members showed stronger, more positive attitudes toward public responsibility than did "upper class" members. Further, older people (60 years and older) showed greater concern for public property than younger people (ages 14 to 25). Widowed, divorced, and separated persons had less concern for the community and its values than married persons. Low concern, too, was most characteristic of those individuals who had lived in their community less than 2 years. Those who had lived in the area more than 10 years expressed greatest concern.

It appears from this study that for best results fire prevention (and vandalism prevention) in an area like Utah County might best concentrate on younger people; the divorced, widowed or separated; and the more mobile or transient segment of the population.

The study of fire prevention personnel and practices in the Division of Forestry, undertaken by the University of California under contract with the Division, has resulted in a report by Adam Sarapata, for internal use. Divergence of understanding within the organization vis-a-vis its goals in fire prevention (and other areas of concern), in the importance of these goals, and in the means of implementing them, were found to exist between different levels of the organizational hierarchy and between different job categories. Perception of priorities revealed that fire prevention is held to be less important than fire suppression and fire detection, but more important than land management advising and consulting. It had about the same importance as a number of other Division activities—for example, nursery and reforestation, State Forest management, and public relations.

The BUCO project is currently at the input stage. Coordinated education and enforcement programs are being conducted by an augmented prevention staff. A

resurvey will be made in 1969 or 1970 to determine the effect of these activities on the public. This research is supported cooperatively by the California Division of Forestry; Pacific Southwest Forest and Range Experiment Station; and Region 5, U. S. Forest Service. During the past year the University of California, Berkeley; George Washington University; Brigham Young University; and Chico State College have assisted with certain phases of research under cooperative agreements with the Station or under contracts with the Division.

Inventory of Wildland Soil and Vegetation

An inventory of wildland soils and vegetation is being carried out cooperatively with the Pacific Southwest Forest and Range Experiment Station, and the University of California.



Soil-vegetation survey crew sampling soils and associated grassland vegetation. Field mapping was completed on 224,000 acres in 1968.

During 1968, field mapping of 224,000 acres was completed; this acreage includes continuing work in

the Butte, Plumas, Calaveras, and Tuolumne County mapping units, and completion of a soil-vegetation survey of Mountain Home State Forest in Tulare County. Grassland sampling was completed in Yuba County, and range land fertility trials were conducted in Calaveras and Butte counties. Laboratory chemical and physical characterization of 174 horizons from 38 soil profiles, was completed.

Two reports, "Soils and Vegetation of the Chancellula Peak Quadrangle, Shasta and Trinity Counties," and "Some Vascular Plants in Sonoma County," were published. Inventory data were prepared for use in the Grass Valley Creek watershed investigation in Trinity County.

Other Research

Research in forest and watershed management continued at low level in 1968 because of budget reductions made in 1966. Assistance was given to San Dimas Experimental Forest of the U. S. Forest Service. About 4,000 man-days of inmate labor from the Prado Conservation Camp was provided for studies dealing with controlling erosion from burned watersheds, and the effect of soil moisture from converting brush to grass.

Four research contracts, having a value of \$42,366, with the University of California continued. In the planting stock physiology project, work was concentrated on determining effects of soil moisture levels and seasons of lifting on the root regeneration potential of Douglas-fir nursery stock. Special efforts were made in the forest rodent control project to study better and safer rodenticides such as diphacinone. In the bark beetle study, attention in 1968 was given mainly to population dynamics and synthetic attractants, while the dwarfmistletoe project was devoted to rates of build-up of mistletoe population in fir, and life history of individual infections.

FOREST, RANGE, AND WATERSHED MANAGEMENT

This program is designed to assist and encourage development, management, and utilization of forest, range, and watershed resources to yield the greatest public benefit to the people of California. Objectives of the program are attained by assistance and encouragement to landowners, demonstrations of good wildland management practices, and by regulation of harvesting practices and other uses. Research studies and practical field tests provide knowledge needed to achieve better development and management of these resources.

State Forests

Considerable progress was made on State Forests in 1968 in timber management demonstration and experimental work, timber harvesting operations, and recreation use on the eight forests comprising 70,398 acres. Here are highlights in capsule form.

Selling boards by the pound may not be too far away! Two large sales were made in young-growth timber on Jackson State Forest in which the volume of timber sold was determined by weighing truck loads of logs before they left the forest. All logs on



Selling logs by the pound! Scaling a load of logs from Jackson State Forest at the mill, to determine the board foot:pound ratio.

some loads were scaled to determine an average board foot:pound ratio. The method proved to be accurate, and reduced scaling efforts with a minimum of waiting time for trucks. Weight-scaling for determining merchantable volume of young-growth logs will be further demonstrated in 1969.

Sowing all fresh road cuts and spoil with grass seed and fertilizer—begun in 1965 as an experiment—has become standard practice on Jackson State Forest. Sowing road beds has shown great promise, especially where these roads will not be used for a year or more.

As a part of meeting the demonstration objective on Latour State Forest, a unique continuous forest inventory system has been established using prism timber cruising techniques instead of the conventional fixed area plots. Through agreement with the University of California, in 1968 they developed the necessary computer programs to process and compile field data and provided the Division with detailed inventory results. This information will be of great value in determining future management plans for the forest. The computational procedures will be published in 1969, to make them available to other timberland managers.

The first timber inventory since the property was acquired was made for Boggs Mountain State Forest. The management plan for the forest will be revised, based on the latest data available.

New black-and-white aerial photography was obtained for Jackson State Forest, and new color photography was secured for Latour State Forest. The 1:8,000 scale color photography will be of special value for delineation of areas for management of Christmas trees. A 28-acre area on Latour was given various Christmas tree stand improvement treatments to improve Christmas tree production. Members of the California Christmas Tree Growers' Association were shown Christmas tree stands, management methods,

and problems encountered in natural Christmas tree culture at Latour. The State Forester's Reforestation Advisory Committee was shown logged stands of red fir at Latour and some of the problems in obtaining natural regeneration of true fir.

A giant step ahead for experimental as well as operational work on Mountain Home State Forest was completion of field work for a soil-vegetation survey of the forest by the State Cooperative Soil-Vegetation Survey. Results from planting red fir trees at Mountain Home indicate this species may serve as a basis for a future Christmas tree business on the forest featuring high quality trees. Red fir has an advantage over white fir because there are few, if any, local sources of dwarfmistletoe that are host-specific to red fir. Several forest regeneration experiments continue on Mountain Home State Forest, including fertilization of seedlings to test effects of urea-formaldehyde pellets. The pellets definitely improved growth in one experiment but were detrimental or slow-acting in others.

White pine blister rust was found for the first time on sugar pine on Mountain Home State Forest. All timber stand improvement work on the forest included pruning or removing trees infected with blister rust. Some 160 acres were treated containing 2,000 infected sugar pine trees. Surveys for detection of blister rust were made on the State Forest and adjoining lands by contractors employed by the U. S. Forest Service. The surveys showed 200 acres on the forest heavily infected and about 1500 acres lightly infected.

The forest manager on Boggs Mountain State Forest gave a brief talk to the California Forest Pest Control Action Council describing chemical stump treatment for protection from root rot infection on timber sales. A publication will be issued soon on this subject.

A study to determine susceptibility of dogwood sprout clumps to certain herbicides and method of application was established on Boggs Mountain. An expanded project to eradicate dogwood and other hardwoods on 60 acres to release understory conifers is planned. A demonstration thinning plot was established in a 70-year-old ponderosa pine stand. Pre-commercial thinning would not be warranted, but thinning in younger stands needs investigation.

Timber sale activity was at an all time high in 1968. Nearly 47.3 million board feet of timber, and 7,590 Christmas trees and other miscellaneous products were harvested, providing \$1,001,734 in revenue. Since 1946 receipts from State Forests have been \$9,823,782, which is 4.5 times the cost of these forests at the time of acquisition. By removing decadent and mature timber the forests have been made more healthy and productive, growing more timber than ever. The State paid the counties in-lieu taxes of \$50,073 for 1967-68 on State Forest properties; and a total of \$615,740 has

been paid since the forests were acquired. Taxes have increased at a startling rate in recent years: For Jackson State Forest they have jumped some \$23,000 for the 1968-69 tax year, a 61 percent increase. In 1968 action was initiated to zone certain forests as agricultural land to bring the taxes more into line with the purposes of public benefit for which the properties are used.

Besides being useful for experimental and demonstrational work, and timber and water they produce, State Forests are valuable for food and shelter they furnish fish and wildlife, and open space they provide for a wide spectrum of activities for the public.

Forest Practice Act

In keeping with objectives set in 1967, enforcement of the Forest Practice Act and Forest Practice Rules was heavily emphasized in 1968. Particular attention was given to getting correction in cases of substantial or critical forest practice rule violations. More action was taken and more cases initiated on corrective action than any time since the Forest Practice Rules have been in effect.

The South Sierra Forest Practice Committee and Coast Range Pine and Fir Forest Practice Committee concluded hearings in 1968 to determine adequacy of their respective District Rules, and recommended amendments to the Board of Forestry. Amended Forest Practice Rules accordingly became effective for the South Sierra Pine Forest District on August 22, and for the Coast Range Pine and Fir Forest District on September 27. The amended rules provide greater protection to streams during logging, and require improved erosion control practices.

District Forest Practice Rules are developed to conserve and maintain productivity of private timberlands for the economic welfare of the state, and continuance of the forest industry. The State Forester administers the Forest Practice Act under policies adopted by the Board of Forestry. Division personnel inspect timber operations to determine and require compliance with the Rules and the Act.

There were two changes in Forest Practice Committee membership. H. A. Peterson, Jr., of Arcata replaced Robert H. Barrett on the Coast Range Pine and Fir Committee. Bernard Agrons resigned from the Redwood Committee and moved to the Pacific Northwest.

In 1968 the State Forester issued 298 new timber operator permits, and renewed 945 permits, collecting \$13,920 in license fees. There were 28 more active timber operators in 1968 than in 1967. Some 2,000 timber operator notices were filed in 1968.

Operators reported cutting 5.06 billion board feet in 1967—about 54 million board feet more than in 1966.

In 1968 the Division made 1,980 forest practice inspections. Statewide, 94 percent of all the rules inspected for were found in compliance, compared with 93 percent in 1967. Over-all compliance with the rules in both the Redwood Forest District and the Coast Range Pine and Fir Forest District was 93 percent. There was 95 percent compliance in the South Sierra Pine Forest District, and 94 percent in the North Sierra Pine Forest District. Inspectors observed 828 infractions of the rules in 1968, compared with 968 in 1967. Forest practice rules most often found in violation were snag disposal, fire plan filing, erosion control, fire rule posting, and slash disposal—in that order.

The Division carried out most law enforcement administratively. The Division sent 412 notices of violation for infraction of forest practice rules in 1968. Division personnel sent many other letters, and held followup meetings with operators to improve compliance with the rules. On areas where infractions were observed, about half were found to be in compliance when repeat inspections were made.

There was one case in 1968 where a complaint was filed by the county district attorney against an individual for operating without a valid timber operator's permit. The outcome of this case will not be known until early 1969.

In early 1968 denial of renewal of 9 timber operators' permits was recommended to the State Forester. Three of these operators corrected violations before their permit renewals were formally denied. The remaining 6 were formally denied permit renewal, and were later issued renewed permits only after they corrected their violations. In another 7 cases correction of violations by the operators themselves was brought about by letters and personal contact through repeated inspections. One operator corrected violations of long standing after being served Notice of Intent of the State Forester to correct and charge for costs.

The first action under Public Resources Code Sections 4615-4618—begun in 1967 to correct violations—continued to make history. This case culminated in 1968, with the Division of Forestry for the first time completing the remaining work to correct all violations, and billing both the timber operator and timber owner for costs.

In summary, through persistent enforcement effort, correction of forest practice violations was obtained in 18 cases in 1968. Eleven cases are still pending in various stages of development.

Pressure of the log export market, especially on young-growth stands, threatened circumvention of the forest practice rules under the administrative regulations for converting timberland to uses other than timber growing. Existing regulations required that the timberland owner file a prescribed affidavit with the State Forester declaring his intent to convert timberland to other use. In September the Board of Forestry

strengthened the requirements and procedures of these exemption regulations. The new regulations require the timberland owner to apply to the State Forester for a Timberland Conversion Certificate and submit a specific plan providing much pertinent information, and showing how and for what purpose the change in land use is to be made. The State Forester may issue a Conversion Certificate, or deny issuance as authorized by law.

Affidavits were filed in 1968 by 75 owners to use 24,740 acres of timberland for purposes other than timber growing. This was more than three times the acreage filed for in 1967. About 80 percent of this acreage was declared by owners for grazing, 14 percent for urban development projects, and the rest for other agricultural or construction purposes. Only one conversion certificate was issued by the State Forester after the new procedure went into effect in September.

The Board of Forestry approved 20 alternate plans in 1968. All were in the Redwood and Coast Range Pine and Fir Forest Districts, for restocking cutover areas by seeding or planting trees in lieu of leaving seed trees or other merchantable trees to meet stocking requirements.



Under the Forest Practice Rules the Board of Forestry approves plans for restocking cutover areas by seeding or planting instead of leaving seed trees. Reproduction (in 1968) on an area logged in 1957 and seeded in 1960 under an alternate plan.

The Division will continue intensified inspection and enforcement against timber operators who fail to correct forest practice rule violations within a reasonable time. The Division will also continue further testing and working to correct rule violations, where needed, with charges to the operator, timber owner, or both for expenses of correction.

Service Forestry

Service Forestry is a nationwide cooperative endeavor to provide forestry advice and assistance to owners of small tracts of forest land and forest prod-

ucts operators. Ten foresters are employed to assist land owners in solving problems of forest reproduction, timber stand improvement, protection from forest pests, harvesting, marketing, and many other aspects of forest and land management. These foresters are located in Fortuna, Willits, Santa Rosa, Redding, Oroville, Camino, Sacramento, Fresno, Monterey, and Riverside.

The 30,000 small forest owners hold about 3.5 million acres of commercial forest that are vital to the state's economy, and especially to the economy of the forested counties. Many additional owners are given help with management problems on several million acres of noncommercial forest land where recreation, special forest products, water, and wildlife are produced.

During 1968, Service Foresters assisted 239 owners and forest products operators per man, compared to a national average of 154 per man. In total, 2,318 persons who own more than 358,786 acres of timberland were assisted. Needs for assistance were diversified: About 6,915 acres were planted or seeded; and 2,672 acres of timber stand improvement was accomplished with Division assistance. Advice was given to 220 forest owners for recreation, water and wildlife management. More than 180 owners were referred to consulting or industrial foresters because of the size, nature, or complexity of the owner's problem.

Nursery and Reforestation

Large quantities of forest seeds are required in California each year for forest nurseries and reforestation seeding. Surveys of timbered areas are made every summer to determine the quantity and quality of cone crops for seed production. Throughout the State 1968 estimates indicated light crops. However, for Division requirements, field and Conservation Camp inmate crews and some private cone pickers were able to collect about 3,000 burlap sacks of cones. Processing of these cones will not be completed until early 1969, but it is estimated that the yield will be about 4,500 pounds of clean seed. Two Conservation Camps—Vallecito in Calaveras County and Morena in San Diego County—have developed equipment to remove seeds from cones. The partially processed seed is sent to the central facilities at the Davis Headquarters Nursery in Yolo County for further cleaning and storing.

Insects can be extremely destructive to many species of cones, particularly Douglas-fir, resulting in loss of the seed crop. In an attempt to find a control method, tests were conducted on Jackson State Forest using systemic insecticides. Douglas-fir flowers were sprayed in April at the time they were receptive to pollen. Results indicated the chemicals reduced insect populations somewhat, but also caused some damage to cones and seeds.

Production from the Division's four nurseries at the completion of the planting season amounted to 2.9 million seedlings. This was approximately 300,000 less than in 1967. One of the four nurseries, Parlin Fork in Mendocino County, was closed at the end of the season. Two nurseries—Magalia in Butte County and Ben Lomond in Santa Cruz County—are being expanded to replace Parlin Fork and to increase total production. Production from private nurseries was also slightly less than last year but still amounted to about 1 million seedlings.

The Advisory Committee on Reforestation met twice in 1968. This committee, authorized by Section 4694, Public Resources Code, advises the State Forester on reforestation needs and methods. The spring meeting was in the northern Sierra Nevada and southern Cascade Mountains; methods for obtaining natural true fir regeneration after logging were observed. The observation resulted in a recommendation that experimental demonstrations in cutting and site preparation be expanded on Latour State Forest to investigate ways to establish true fir regeneration more reliably. The Committee also recommended investigating factors affecting true fir regeneration in the northern Sierra Nevada, cooperatively with a private landowner.

The winter meeting of the Committee was held at the University of California School of Forestry and Conservation, Berkeley. Research in forest genetics and planting stock physiology was reviewed. Following this the Committee took an active part in the San Francisco meeting of the Western Reforestation Coordinating Committee of the Western Forestry and Conservation Association. Reforestation on State, municipal, and private land by seeding and planting was considerably less than in 1967. Area reforested declined from 13,540 to 10,230 acres. The greatest reduction was in seeding operations, from 7,787 acres to 5,468; it was due primarily to less seed being available.

A number of cooperative reforestation studies were conducted on private land, through agreements with landowners. Two studies, one at Blue Canyon in Placer County and one on the Georgetown Divide in El Dorado County, tested machine and broadcast seeding of white fir, Douglas-fir, and ponderosa pine. Ponderosa pine provided adequate stocking (about 400 trees per acre) from both methods but white fir and Douglas-fir on the exposed sites did not.

In Calaveras County, American Forest Products Corporation cleared several acres of brush to prepare the ground for a catch of the 1967 natural seed fall. There are a few scattered residual young growth ponderosa pine in the area to furnish the seed. The company also provided rodent control to protect the seed. Regeneration sampling and survival counts by Division personnel at the end of the growing season indicated a more than adequate take—9,670 seedlings to the acre after only 27 percent mortality.

Following the recommendation of the Reforestation Advisory Committee, a study was established on the Fiberboard Corporation Webber Lake Tree Farm to determine factors affecting red fir regeneration. When the study was established in June, a large number of seedlings was germinating from the bumper seed crop of 1967. Analyses of all factors have not been completed yet. However, an average survival of 65 percent at the end of the first growing season left 22,800 seedlings to the acre.

Poor quality of white fir nursery stock still plagues forest nurserymen and tree planters. To test possible effects of several packaging and storage techniques, a study was started on plots at the Growlersburg Conservation Camp and in the laboratory at the Davis Nursery. Survival in the Growlersburg plots, and numbers of new roots on test seedlings in the laboratory, indicated all treatments were good with the exception of the control: 10 weeks refrigerated storage without any protection around seedling roots.

Tree improvement studies included planting knobcone-monterey pine hybrid seedlings by landowners throughout the State and at Division administrative sites. Survival figures will be compiled in early 1969. Other studies were designed to continue testing knobcone X Monterey; Jeffrey X Jeffrey X Coulter; and within-species ponderosa pine hybridizing.

Forest Pest Control

The Division's forest pest responsibilities are concerned with detection, appraisal, and control of damage caused to forest trees by insects, disease, and animals. Control of insect epidemics and disease infection centers on state and private lands is conducted on "zones of infestation" approved by the State Board of Forestry. Cooperation in control is also obtained from landowners and the U. S. Forest Service.

Losses from insects were below normal in 1968. Bark beetles accounted for most of the tree mortality, which was heaviest near McCloud. A serious scale infestation developed at South Lake Tahoe. The Douglas-fir tussock moth was found again in California, but not in epidemic proportions.

Forest disease activity was highlighted by the southward movement of blister rust, from Tuolumne County to Tulare County—a distance of 175 miles. The largest infection center was found on Mountain Home State Forest. Additional new areas infected with root rots were also discovered. Air pollution in Los Angeles and San Bernardino counties continued to cause tree mortality.

Deer depredation caused the most extensive animal damage. Bear damage was reported to be on the increase in the North Coast region.

The Division participated in two large cooperative appraisals of forest insect damage: (1) the Big Bend mountain pine beetle infestation, with the U. S.



Lodgepole pine needles infested with scale. A serious infestation has developed on pine trees at the south end of Lake Tahoe.

Forest Service and a private landowner; and (2) the pine scale problem at South Lake Tahoe, with the U. S. Forest Service. The Division also cooperated in a statewide detection and aerial survey of forest pest damage covering 5 million acres.

Ten projects were conducted for control of bark beetles, in which 2,604 trees were treated in 1968. Blister rust control in cooperation with the U. S. Forest Service and private owners covered 35,281 acres.

Timber Taxation

Section 12 $\frac{3}{4}$ of Article XIII of the State Constitution exempts remaining timber from taxation for 40 years or more after cutting the original stand, under certain conditions. A Timber Maturity Board must then declare the timber "mature" before it can be put back on the tax roll of the county. The Maturity Board consists of the assessor of the county in which the timber is located, and one representative each from the State Board of Equalization and the State Board of Forestry.

The Division of Forestry has certain responsibilities connected with maturity declarations under Section 12 $\frac{3}{4}$: record keeping, participating in field examinations, and assisting the Board of Forestry member. Timber stands must be considered for return to the tax roll as soon as they pass 40 years after cutting. Criteria for determining maturity are whether the

trees in the stands are comparable in quality and size to timber generally being harvested in the area.

In Humboldt County during 1968 the export log market continued to strongly affect utilization of small, relatively low quality trees from young-growth stands within an economic haul distance of Humboldt Bay. Stands in other counties within economic distance of the deep water ports of Stockton, Sacramento, Benicia, and Redwood City also felt the pressure from the log export market.

In 1968 Maturity Boards convened and formally declared 67,968 acres of timber mature on 29 properties in Butte, El Dorado, Humboldt, Lassen, Plumas, Siskiyou, and Tehama Counties. Since the first Maturity Board declaration—in 1955—timber has been declared mature on 465,284 acres on 953 properties, in 14 counties.

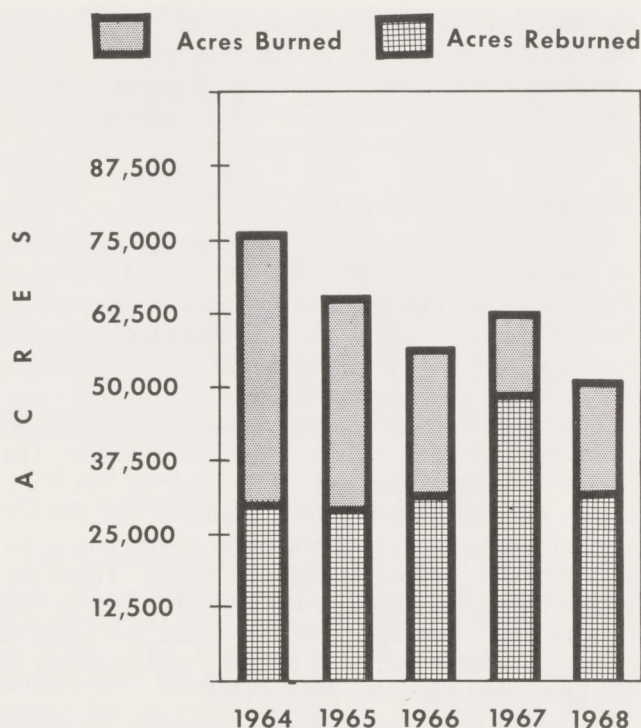
A preliminary field examination for timber maturity was made in Tuolumne County in late 1968. More field examination and formal Maturity Board action are pending for 1969. During 1968 the Governor's Advisory Commission on Tax Reform began a study of property taxation including the taxation of timber.

Brush Range Improvement

Private landowners continued to use fire in the management of 53,042 acres of brush-covered range land in California during 1968. Applications for burning were received from 182 ranchers and sportsmen proposing to burn 108,478 acres of brush range land for both livestock range and wildlife habitat improvement. Permits, with recommendations regarding the use of fire, were issued to 168 individuals. These permittees conducted 142 controlled burns of which 18 were cooperative projects involving two or more adjacent landowners. Division regular fire control forces stood by to help protect adjacent property in the event of a fire's escape during the burning of 32,540 acres, on 47 separate burning projects.

Activity in the brush range improvement program has continued at about the same level over the past five years. Since 1945 about 2,358,500 acres of unwanted vegetation have been treated by fire in California, including a repeat burning of 689,135 acres to maintain a range forage cover.

During the past season 5,929 acres of brush were treated with mechanical equipment prior to burning, and 13,770 acres were seeded with forage plants. Chemical control follow-up treatment continues on the upswing. The use of chemicals, in some areas, appears to be replacing fire for removal of brush sprouts and seedlings. An estimated 800 acres of standing brush that had been previously sprayed with chemicals was burned this past season. Burning results were reported to have been excellent where burning followed chemical spraying of standing brush.



Controlled burning for brush range improvement declined from the 1967 level, and is below the current five-year average. Reburning continues at a high rate, accounting for some 65 percent of the total area burned in 1968.

Division range specialists provided advisory services to over 400 ranchers and sportsmen, helping them solve controlled burning, and other problems of brush range improvement. Also, range improvement field projects were continued in Tehama, San Luis Obispo, and Riverside counties.

Emergency Revegetation

Runoff from burned watersheds may cause severe soil erosion, flooding, and sedimentation downstream. Establishing a temporary vegetative cover of herbaceous plants may reduce or prevent excessive runoff

until the cover is restored by natural means. The Cooperative Emergency Revegetation Program, authorized and conducted under Sections 4675-4677 of the Public Resources Code, provides for seeding critical watersheds in an attempt to reduce damage from runoff that would be detrimental to public health and welfare.

Emergency revegetation activity during 1968 was much below the 1967 level. Eight projects were completed in four different counties. Eight major fires burned 41,422 acres of public and private watershed lands, all in southern California. Field examination determined that 33,957 acres qualified for seeding under the state's cooperative emergency revegetation program. A total of 6,853 acres of private land and 640 acres of state-owned land received emergency treatment (table). Similar emergency treatment was given to 26,464 acres of intermingled public lands.

Personnel of the Division of Forestry directed seeding on 4,165 acres of watershed burned in three major fires in San Diego County. Seeding was by helicopter, sowing wimmera ryegrass (*Lolium subulatum*) at the rate of eight pounds per acre; the cost averaged \$1.74 per acre. In addition, the Los Angeles County Fire Department directed seeding on 3,313 acres, and the U. S. Forest Service directed seeding on 26,479 acres, of both public and private lands in five major burns in Los Angeles, San Bernardino, and Riverside counties.

Emergency Revegetation Activity in 1968

Fire	Date	Total burned (acres)	Land to be seeded (acres)		
			Public	Private	Total
Easley	Jul 12	600	220	370	590
Magee	Aug 8	1,930	520	1,237	1,757
Canyon Inn	Aug 23	19,100	17,310*	1,790	19,100*
Proctor	Aug 25	1,938	137	1,103	1,240
Middle Fork	Sep 7	6,840	5,640	560	6,200
Limerock	Sep 9	2,846	2,553	293	2,846
Poppet	Sep 10	6,364	724	332	1,056
Harris Spur	Sep 25	1,804	---	1,168	1,168
		41,422	27,104*	6,853	33,957*

* Includes 640 acres of state-owned land.

FIRE PREVENTION EDUCATION

The objective of the Fire Prevention program is to significantly reduce occurrence of forest fires, and hold resulting resource loss below the level which will interfere seriously with expected yield of products and social benefits. The immediate objective is to reduce forest fires from the present level of 22 per 100,000 population to 15 per 100,000. This is being accomplished by close working relationships with other governmental agencies, industrial organizations, and citizens groups; it is successful to a degree commensurate with manpower available to accomplish the job.

Fire Prevention Activities

In 1968, fires occurred on Division protection areas at a rate of approximately 22 per 100,000 population. Although it would appear from these figures that the program was not materially successful in 1968, consideration must be given to the fact that the ever-expanding population in California continues to complicate the total fire prevention effort.

Keeping fire occurrence near the 1967 level is an indication of the success of this program. The Butte Ranger Unit was chosen for a pilot Fire Prevention

Program, referred to as the BUCO Project. This Ranger Unit received full, planned fire prevention manpower implementation in 1967. While forest fire occurrence on state responsibility areas was more than 900 fires above the five-year average statewide, Butte Ranger Unit showed a marked decrease from the average. These results show that fires can be prevented when positions critically needed are filled to carry out a total prevention program. (Other fire prevention research was discussed on page 16.)

Fire Prevention Handbooks, being prepared for field use, were to be issued by mid-year 1968. Because of the workload in other areas, this was not possible. However, portions of two handbooks should be ready for field use by April or May, 1969. Other portions of these handbooks should follow shortly thereafter.

The Fire Prevention program emphasized co-operation with other agencies to secure the best possible results. Fire prevention efforts were coordinated with organizations such as Keep California Green, Inc., Redwood Region Conservation Council, California Federation of Women's Clubs, California State Chamber of Commerce, Pacific Telephone Company, and Southern California Edison Company. A very close working relationship with the U. S. Forest Service gave the advantage of pooling efforts in fire prevention and conservation education.

The Southern California Edison Company and the Pacific Telephone Company hosted the 1968 California Fire Prevention Committee meeting in Los Angeles and San Francisco. The general topic of the meetings centered around new methods of achieving a better fire prevention program by committee members, who represent the organizations or companies, and in some instances, individual effort.

Considerable effort was made to recruit additional citizen groups and individuals to help forest fire prevention in their particular areas of endeavor. The Fire Prevention Research Committee met on two occasions to discuss fire prevention research and to make recommendations where research was felt necessary.

The Division and the Agricultural Extension Service of the University of California began a cooperative fire prevention program to be carried on by Rangers and Farm Advisors. Part of this program is an information sheet, "Focus on Cooperative Rural Fire Safety," being published periodically and distributed to field personnel of both organizations.

Administrative Advisor

All hurdles were cleared by November for establishment of a new key position—Administrative Advisor, on the State Forester's staff. This position will be filled early in 1969 by an attorney with broad legal experience. He will report directly to the State Forester, and assist in providing legal counsel to the State Board of Forestry and Forest Practice Committees. In addition,

his work will involve development of administrative regulations, preparation of cases relating to forest practices, and recovery of fire suppression costs. A Legal Stenographer position will be established to support the Administrative Advisor.

Information and Education

The annual California Fire Prevention Committee awards were presented by the California Division of Forestry to Joe DeLucchi of DeLucchi Farms; and to Keep California Green, Inc., for outstanding public service in forest fire prevention. Meetings of this Committee were held in late May.

This committee again distributed a vast amount of fire prevention material through normal outlets. The Pacific Telephone Company, a member of this committee and past award winner, displayed fire prevention posters on the side of telephone service trucks for a two-month period during fire season. Telephone booths throughout the state also carried an appropriate fire prevention message. This committee, and Division employees, distributed more than 6½ million pieces of fire prevention literature during 1968.

A special television spot announcement, produced from color film showing disastrous 1967 fires, was distributed. This spot was narrated by Assistant Deputy Leonard Chatten. State Forester Francis Raymond stressed the need for "fire safe" action, in another spot narrated in front of a burned out mansion. These spots were well accepted and shown on TV stations throughout the state.

An eight-minute Sniff and Snuff feature color animation was taped with Fire Prevention Officer Dick Ernest on Channel 13 (Sacramento, ABC). The video tape was shown throughout the state on the California Farm Bureau Federation summer TV series.

The Division started a filming program to obtain front-line motion picture shots for eventual use in fire prevention TV spots and training films. Training in care and use of movie equipment was given to selected Fire Prevention Officers in each District by George Fox of Public Service Films. A contract was made with the Department of Water Resources to store and catalog the original films; our personnel will edit film to be used.

Work began on updating the training film "Campaign Fire." Assistant Deputy Leonard Chatten wrote the new script which describes the latest developments in forest fire strategy and logistics.

Sniff and Snuff, animated fire prevention characters developed a few years ago by Public Service Films in cooperation with the Division of Forestry, were again shown on television. Twenty-, thirty-, and sixty-second announcements of Sniff and Snuff giving three different fire prevention messages were accepted very well by the television public service directors.



Sniff and Snuff, two animated fire prevention characters, continue to highlight Fire Prevention activities.

The California Federation of Women's Clubs once again did an outstanding job in forest fire prevention throughout the state. They set aside one week in May for Forest Fire Prevention, during which the State Conservation Chairman encouraged all local clubs to present fire prevention programs and distribute literature on forest fire prevention. The women's club concentrated on school children from kindergarten through sixth grade.

A fire prevention award was initiated for this spirited group. Last year an attractive plaque was presented to the California Federation of Women's Clubs at their state meeting in Bakersfield. This award will be presented annually by the Division, to the organization or individual that does the most in forest fire prevention with children in kindergarten through the sixth grade.

A new serial publication, "California Fire Prevention Notes" was begun. Successive issues of this publication will help keep the field informed of new and successful approaches to reducing incidence of forest fires.

The Division worked with the Office of Economic Opportunity to develop a teacher's kit for preschool children. A cooperative research project was established in Riverside Ranger Unit to study the effect of this preschool fire prevention program on young children. New, simplified material was developed specifically for this project. If this material proves effective, it will be printed in larger quantities for use of field personnel working with preschool and early elementary school children.

A report was made to the State Board of Forestry on the children-and-matches problem in California. A program relating new methods used in fire prevention with preschool and early elementary school children was presented to the California-Nevada Fire Research Committee at their annual meeting in Sacramento. The film library was updated with addition of new and modern conservation and fire prevention education



The "Headstart" Fire Prevention Program, being conducted in Riverside Ranger Unit in cooperation with the Division of Forestry, is explained by Mrs. Dolly Lynch, Director of the Headstart Project, Office of Economic Opportunity.

motion pictures, replacing those no longer suitable for showing.

Citizens groups, organizations, and other governmental agencies worked closely with the Division and attained remarkable results in a successful Information and Education Program.

Fire Prevention Engineering

A committee was established early in the year to complete the Handbook on Fire Prevention Engineering; it is scheduled for field distribution about April, 1969. Primary emphasis of the Handbook is providing useful information and instruction to personnel conducting fire prevention work on a day-to-day basis with the public.

Another committee, comprised of representatives from all major private, municipal, and district electric utility organizations, was organized to review the State Forester's regulations on hazard reduction measures necessary on powerlines and facilities. The committee is currently running tests on certain electrical hardware; it will have some recommendations for regulation changes prior to the 1969 Fire Season.

The largest electric utility in the state, Pacific Gas and Electric Company was urged to develop a liquid fuse to replace the open link type used in wildland areas. Final tests have been completed on the fuse; it looks very promising in eliminating fires caused from open link fuses.



A liquid fuse was developed to replace open link fuses used on power lines through wildlands. Attaching liquid fuses to open link fuse holders was a major problem. Above are some of the holders tried before a satisfactory one was designed.

The State Forester's office was represented on the State Fire Marshal's Explosives Advisory Board. Due to new state statutes, the entire field of explosives is now more stringently controlled by the state's fire agencies. The Board assisted the State Fire Marshal in establishing regulations for handling, transporting, using, and storing explosives.

Recognizing that railroad fires have become an increasing problem, a cooperative program testing railroad locomotive spark arresters was begun. Testing will be done on regularly scheduled trains using a device designed and constructed by Division personnel. One such test has been completed on the Southern Pacific Railroad, on a SD-9 model locomotive. Testing will continue in 1969; after evaluation of results, changes in spark arresters may be necessary for some railroads. While testing arresters, operating procedures by the railroads are being noted and will be studied for possible changes to reduce fires on rights-of-way. The Society of Automotive Engineers finally did adopt standards for test carbon, and test procedures to be used in determining effectiveness of various classes of spark arresters.

Small chemical extinguishers, weighing approximately one pound, were tested to establish standards for use with portable power tools. The new standards will be issued as administrative regulations of the State Forester, to become effective before the 1969 Fire Season.

Law Enforcement

Statutory changes were enacted by the State Legislature in 1968 which affect prevention and enforcement work. A number of fire prevention bills were sponsored as departmental legislation; about half were enacted into law; several of the remaining bills will

be submitted again. Highlights of legislative changes were:

- Powers of all peace officers were amended broadly; Division peace officers were given authority to enforce forest laws and regulations.
- Tracer ammunition was classified as a "destructive device" under the Penal Code, to be controlled as other materials similarly classified; the requirement that the State Forester issue permits for using tracer ammunition was repealed.
- The type of fire tools required for certain high fire risk activities in wildlands was specified.
- Number of fire extinguishers required on harvesting equipment was reduced.
- The Public Resources Code was amended to clearly require written permits for sawmill burners and other enclosed incinerators.
- The State Board of Forestry was authorized to adopt administrative regulations to regulate recreation and other activities of the public on State Forests.

Criminal prosecutions for fire law violations increased, 422 arrests being made for misdemeanor violations in 1968. They resulted in 330 convictions and 50 formal actions against juveniles through the Juvenile Court system. Criminal cases were begun against 28 adults for felony fire law violations. Six felony convictions were obtained, while many other adult cases resulted in pleas of guilty to lesser charges; commitments to mental institutions; return of violators to military authorities for prosecution; or prosecution for other crimes committed concurrently with arson. Sixteen cases concluded against juveniles would have been felonies if the violators had been adults.

The Health and Safety Code (Section 13009) authorizes the state to collect suppression costs where fires are due to wilful or negligent acts, or in some cases to violation of law. Action to recover costs under this statute resulted in settlement of 670 cases and collection of \$120,000. Negotiated settlements were concluded with several major utility and railroad companies, amounting to approximately \$80,000, which was not received during 1968. Examination of reports received by December 15 indicate a potential for recovering \$172,000 of the expenses incurred in controlling fires in 1968.

Prevention inspections conducted to obtain compliance with requirements for spark arresters resulted in serious re-evaluation of the effectiveness of spark arresters currently in use on railroad locomotives. These inspections have resulted in significant engineering work, and a test program to be carried out during 1969 by the Fire Prevention Engineering section. De-

sign and availability of effective spark traps for field use will materially aid collection of physical evidence for use in both civil and criminal cases.

In-service training for Division peace officers continued at the Fire Academy. One hundred seventy-seven officers received training: 22 completed the Basic Peace Officer Training course of 240 hours; 21 completed 160 hours instruction; and 82 officers completed the first 80 hours of instruction. Course LE-7 provided 40 hours of enforcement training for Forest Practice Inspectors. This is the first time this training has been provided. Instruction in enforcement was continued for administrative personnel and members of the Arson Investigation Unit.

Enforcement of the Forest Practice Act was further intensified during 1968, and resulted in several cases which were important in establishing future enforcement procedures. Staff recommendations were submitted to the Board of Forestry for strengthening administrative regulations governing conversion of timberlands to uses other than growing timber.

Plans for 1969

Research will continue to assure each phase of the Fire Prevention Program is made as effective as pos-

sible. The Fire Prevention Research Committee will continue to evaluate the Fire Prevention Program and recommend areas where research is necessary.

The Office of Economic Opportunity and the Division of Forestry's cooperative research project with preschool children will continue. Results from this program should be evident toward the latter part of the year.

The Handbook Committee, preparing detailed instructions for the use of personnel in the field, should complete a majority of the handbooks by the end of 1969.

There will be continued evaluation of all fire prevention literature designed for use with children and adults. A new 40-hour in-service training program on information and education will be presented for the first time in May, 1969. This training will be held in Butte Ranger Unit as a pilot project.

The Division with cooperation of the State Department of Water Resources, will endeavor to produce TV spots of a fire prevention nature using actual fire disaster scenes. An effort will be made to "startle" the general public through the TV station—the medium reaching the largest public at the most critical fire occurrence time.

MANAGEMENT SERVICES

The Management Services Program provides assistance in effective planning, organizing, and managing activities of the Division of Forestry under applicable laws and existing regulations. The Division is a large, multi-purpose organization which maintains and administers more than 400 separate installations widely dispersed about the state. Management Services provides administrative support to all other Division programs to assist them in reaching their individual objectives.

Managerial Processes and Budget Planning

The Management Services Section functions to provide guidance and services to other staff sections essential to developing plans for management, and in carrying out managerial functions. Principal areas of responsibility are data collection and analyses; estimating costs and directing budget planning and preparation; and providing support and assistance in achieving optimum utilization of manpower and other resources. Management Services also provides guidance and assistance in purchasing and storing equipment and supplies; and managing both property and records.

The budget for the Division of Forestry for the fiscal year 1968-69 (July 1, 1968-June 30, 1969) is summarized, by object of expenditure, on page 28.

Manpower Utilization and Personnel Management

During 1968 there were 646 new permanent appointments to fill vacant positions in the Division. As of December 31, 1968, there were 2,625 year-long employees, and at the peak of fire season total employment reached 4,609, including seasonal drivers and firefighters.

In an effort to meet the challenge of an early and potentially disastrous fire season the Division was given emergency authorization by Governor Reagan to hire additional firefighters to bring fire crews up to planned strength. Working with local employment offices and Youth Opportunity Centers, and hiring disadvantaged youths as much as possible, peak fire crew strength was increased by almost 400 firefighters. To do this required hiring a total of some 730 individuals, since there was an unusually high turnover rate in this group. Nevertheless, this emergency hiring program enabled the Division to maintain maximum fire crew strength during the critical late summer months.

Suspension of the Division's professional forester recruitment efforts continued as a result of elimination of the trainee positions in the 1967-68 budget. Ten upper-division forestry school students were employed during the summer as Forestry Aides.

Twenty-nine employees retired during the year; five for disability reasons. Among the retirees were

DIVISION OF FORESTRY BUDGET—Fiscal Year 1968-69

(1) GENERAL SUPPORT (Excluding Emergency Fire)	\$31,423,242
(2) FOR OTHER AGENCIES (Protecting State and Private Responsibility Land)	4,176,151
(3) EMERGENCY FIRE FUND	1,500,000
(4) BLISTER RUST CONTROL	40,000
(5) INSECT CONTROL	20,500
(6) FOREST AND FIRE RESEARCH	272,998
(7) TOTAL ABOVE	37,432,891
(8) CAPITAL OUTLAY (Available Funds)	1,862,416

Explanation of above budget:

(1) The Support Budget for the Division of Forestry was increased approximately \$1,985,222 over the 1967-68 fiscal year level. This represents a net condition after recognition of a 5% salary increase, restoration of 27.6 man-years for Forestry Cook, reduction from two firetrucks to one at five stations, and the following personnel deletions applied as the result of administrative and Legislative action:

Administration

- 1 Associate Equipment Engineer
- 1 Civil Engineering Technician I
- 1 Delineator
- 2 Engineering Aid II
- 1 Forest Truck Driver
- 1 Storekeeper I
- 1 Skilled Laborer
- 1 Groundsman
- 1 Stock Clerk
- 1 Laborer

District Headquarters

- 3 Carpenter
- 6 Painter
- 1 Forester I
- 5 Groundsman

Field Services

- 1 State Forest Ranger
- 5 Intermediate Clerk

(2) Allotment of funds to other agencies for protection of state and private land for which the Division is responsible increased \$327,000. The change can be attributed to a 5% salary increase and alternate salary range adjustment to keep this service on a parity with similar lands protected by the State.

two Rangers and two Associate Rangers with long careers with the Division. James G. Fenlon, State Forest Ranger III, San Diego Ranger Unit, retired after 33 years of service; Charles P. Campbell, State Forest Ranger II, Butte Ranger Unit, retired after 39 years of service. Walter H. Mueller, Associate State Forest Ranger, Calaveras Ranger Unit, retired after 33 years of service; James W. Warford, Associate State Forest Ranger, El Dorado Ranger Unit, retired after 23 years of service.

The following persons also retired from careers with the Division of Forestry:

- Ira K. McCoy, Forestry Foreman I, St. Helena
- Lester P. Bragg, Forestry Foreman II, Angels Camp
- Trygve Krogsrud, Painter I, Sacramento
- Glen McMullin, Forest Fire Truck Driver, Monte Vista

(3) Emergency Fire Fund is a basic appropriation of \$200,000. The need has exceeded \$2,000,000 in an extremely bad fire year. Augmentation from the so-called Governor's Emergency Fund is requested when need arises. Anticipated 1968-69 expenditure is \$1,700,000.

(4) State allotment paid to U.S. Forest Service in matching expenditure for field projects was \$40,000. The Blister Rust program was confined to prime lands growing sugar pine.

(5) Allotment fluctuates, based on anticipated need for control projects in areas of serious infestation.

(6) Funds for Forest and Fire Research in the 1968-69 Fiscal Year are approximately \$2000 less than allowed for the 1967-68 Fiscal Year. Although funds available were about same each fiscal year, the services were reduced in 1968-69 as funds were not made available to cover price and salary increases.

(7) Totals set forth represent the net budget of the Division. Gross budget is approximately \$46,352,000, reimbursed by the following:

- (a) From the U.S. Government in support of the Oak Glen Job Corps Conservation Center, \$918,000 (does not include Capital Outlay).
- (b) Rural-Structural Fire Protection \$6,193,000 (contracts with counties and fire districts).
- (c) From U.S. Department of the Interior: Fire Protection of 3.6 million acres of scattered public domain lands, \$497,000.
- (d) Other reimbursements: Collections for services to employees; rentals to other agencies; services to other agencies; and so forth, \$1,311,000.

(8) Capital Outlay funds total \$1,862,000. Of this amount, \$1,047,000 represents the unexpended balance from prior year appropriations.

- Vernon E. Stahl, Assistant State Forest Ranger, Camino
- Cosme J. Vicencio, Forestry Foreman II, Auburn
- Hazel M. Glacken, Senior Clerk, Sacramento
- Thomas S. Frakes, Assistant State Forest Ranger, Fortuna
- Jack McIlroy, Assistant State Forest Ranger, Fort Bragg
- Harold M. Shaw, Forestry Foreman II, Fort Bragg
- Thomas J. Ray, Forestry Foreman I, Redding
- Clifford E. Pooler, Sr., Forestry Foreman II, Auburn
- Steve G. Scourkes, Lead Groundsman, Davis
- David F. Hall, Assistant State Forest Ranger, Red Bluff
- Roy Gadbury, Forestry Foreman II, Mountain Home Conservation Camp
- Murven R. Babcock, Forestry Foreman II, Intermountain Conservation Camp

Alice L. Finch, Steno II, Sacramento
 William L. Freeman, Forestry Foreman I, Susanville
 Claude E. Huse, Forestry Foreman I, Thousand Palms
 Charles B. Sweetwood, Fire Prevention Officer, Monte Vista
 Everett C. Carlson, Assistant State Forest Ranger, Monte Vista
 Julia H. McDill, Steno II, Santa Rosa
 Arthur P. Pirazzini, Assistant State Forest Ranger, Paradise
 Robert W. Matheson, Assistant State Forest Ranger, Hammond
 Louis H. Brown, Forestry Foreman I, Nevada City

Legislation was enacted to offer a second opportunity for 515 Division employees still under the old one-half pay at age 60 after 20 years of service formula to elect to be included under the 1/60th service retirement formula. (The 1/60th formula generally provides for a greater retirement allowance after age 60 for any employee hired before he reached his 36th birthday.) Technical changes were also enacted into law to provide "safety member" protection for the last of the Job Corps classifications which inter-promote with other Forestry classifications. Representatives of management and the State Forester's Forestry Retirement Committee made considerable strides toward developing a new service retirement formula for Division of Forestry "safety members." The proposal would provide for a 2% allowance for each year of service after reaching the age of 55, with the maximum allowance set at 75%. Legislative activity is anticipated during the 1969 session.

Joe Haggard, Foreman from the Nevada-Yuba Ranger Unit, was presented a Medal of Valor for extraordinary heroism by Governor Ronald Reagan in February of 1968. Haggard was given this award for his extraordinary heroism when he rescued a fellow Division of Forestry employee, who was trapped in a fire, which both of the men were fighting.

This action took place when Haggard noticed a sudden change in the fire pattern and attempted to radio a warning to a fellow employee operating a bulldozer. Haggard could not contact this individual. Fully aware of the danger, he hurried along the fire line to warn his fellow worker of the advancing flame. Both men were trapped by the blaze. They took cover under a fire resistant blanket; however, the oxygen under the blanket was soon used up and the two men

were forced to seek refuge in a nearby irrigation ditch. Both men suffered severe burns, but thanks to Haggard's quick thinking both men are still here today to talk about it.



Forestry Foreman Joe Haggard was presented the Medal of Valor for extraordinary heroism, by Governor Reagan in February, 1968.

Governor Reagan praised Haggard for his heroic act during a brief presentation ceremony in the Governor's Office. Reagan said: "This act of courage is consistent with the highest traditions of public service; as Governor I extend to you the great appreciation of the citizens of this State."

Twenty-two employees were given their 25-year awards. Fourteen employees received Merit Awards.

During the year a Vocational Rehabilitation Program was developed for Division personnel and a pilot program implemented in the North Coast, Sierra Cascade, Central Sierra, and San Joaquin districts. As a result of this program, rehabilitation counselors worked with 13 disabled employees and 3 were successfully placed in other jobs with duties compatible with their disabilities.

Starting in July, 1968, a Program Time Reporting System for all employees was placed into operation. Program input information derived from this System will be used for program management and budgeting.

As a result of an in-depth study of individual Ranger Units and Staff Ranger positions, 9 Unit Ranger and 9 Staff Ranger positions were reclassified commensurate with their increased responsibilities and Unit workload evaluations.

ENGINEERING AND CONSERVATION CAMPS

The Engineering and Conservation Camps program serves a dual function. Responsibilities of engineering and construction involve establishment of standards, and performance of work necessary in the areas of

land acquisition, surveying, mapping and graphics, and design, construction, and maintenance of facilities.

The Conservation Camp Program is interdepartmental—between the departments of Conservation,

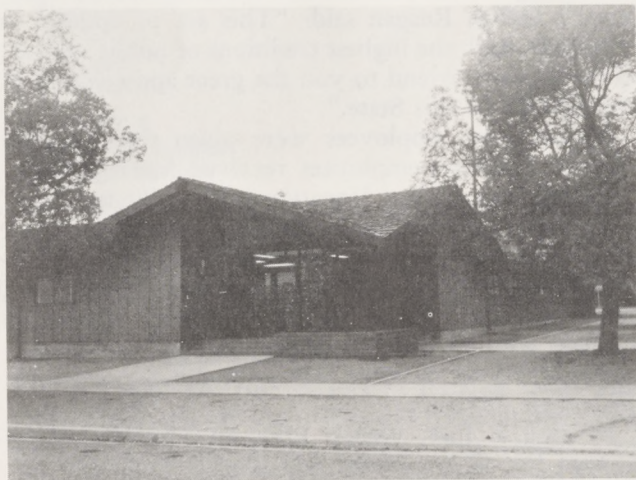
Youth Authority, and Corrections. It is designed to provide a beneficial environment, and living-working experience conducive to rehabilitation of inmates and wards assigned to conservation camps; and an essential trained force for firefighting and other resource conservation work.

In addition, this function is concerned with the administration of the Oak Glen Job Corps Conservation Center and similar programs such as the Neighborhood Youth Corps.

Engineering and Construction

Replacement of the 80-ward Ben Lomond Youth Conservation Camp in Santa Cruz County was completed; it was dedicated on October 18, 1968. Similarly, Pine Grove Youth Conservation Camp, in Amador County is nearing completion. With this event, all conservation camps will be vintage 1949 or later.

Two replacement forest fire stations were also completed—Copperopolis Forest Fire Station in Calaveras County; and Red Mountain Forest Fire Station in San Diego County. Two ranger units—San Bernardino and Santa Cruz—received new office buildings. In addition, Monterey Ranger Unit Headquarters in King City received a new barracks, messhall, and an ex-



New office building, San Bernardino Ranger Unit Headquarters.

panded warehouse. The toilet and shower room of the existing barracks building at Oak Glen Job Corps Conservation Center was completely replaced.

Some 25 minor construction projects were completed during the year by Division of Forestry forces. These projects involved office, barracks, messhall, warehouse, and equipment building expansion or remodeling. New buildings were erected and other developments completed at six air attack bases. Other construction projects include completion of twelve 10,000-gallon water cisterns, as well as 14 water devel-

opment projects involving new wells and water treatment systems.

The maps and graphics group completed a new map for Del Norte County and one for the Mountain Home State Forest. Besides the exhibits prepared for court cases, original design for fire prevention roadside signs, handbooks, and training aids, a major effort was devoted to development of illustrative material for the "Headstart" Fire Prevention Program.

Fee title was acquired by the state to six parcels of land which then were transferred to the Division of Forestry for administration. One parcel represented the start of a new forest fire station to be identified as Robinson Mills, which will replace the old Hurleton Forest Fire Station in Butte County.

Easements over 266 parcels were acquired during the year—a 25 percent increase over the number processed the preceding year.

Surveying activity by the team assigned to the State Forester's Office has been severely reduced since the reduction of two positions. Some work has continued, however, in establishing exterior boundaries on the Jackson and Boggs Mountain State Forests, and several site surveys were completed.

Conservation Camp Program

Two important benefits accrue to the people of the state from the Conservation Camp Program. These are: The Division of Forestry accomplishes conservation projects in remote areas, that would not otherwise be constructed; and adult inmates from the Department of Corrections, and juvenile wards from the Department of the Youth Authority obtain valuable work experience on important and necessary projects under supervision of experienced foremen.



Rustic footbridge on a hiking trail, constructed by a Conservation Camp crew—one of many examples of the beneficial use made of these crews.

There were only minor changes in the camp program during 1968. No additional new camps were built, but one old installation was replaced with an

entirely new plant. Work on the replacement of a second camp was begun this year.

The new structures at Ben Lomond Youth Conservation Camp in Santa Cruz County were dedicated on October 18, 1968. The original camp, activated on May 1, 1947, consisted mostly of old wooden structures that had been moved to the site from other locations. After more than twenty years of continuous operation, modern structures have replaced these superannuated buildings. Residences for administrative personnel were also replaced by buildings of the latest design.

Site preparation at Pine Grove Youth Conservation Camp in Amador County started in 1967. Construction on replacement buildings began during the last week of February 1968; the new plant is scheduled for completion early in 1969.

There were 33 conservation camps in operation at the end of 1968. The total capacity of 2,680 inmates and wards is the same as for 1967.

Conservation Camp Statistics for 1968

Active Camps	Type	Population
29	Adult Inmates	2,380
4	Youth Authority Wards	300
Total Population		2,680

Distribution of the 33 Conservation Camps among the six administrative districts is shown in the table, together with the camp population in each district.

Distribution of Conservation Camps

District	Number of camps	Inmate and Ward Population
North Coast	7	580
Sierra Cascade	6	500
Central Sierra	6	490
San Joaquin	4	320
Central Coast	3	210
Southern California	7	580
Totals	33	2,680

Work Performed by Conservation Camps During 1968

Activity	Man Days	Percent of Total
Fire Suppression, Mop-Up, and Patrol ..	92,864	11.06
Pre-suppression and Facilities	51,992	6.21
Fire Defense Improvements	225,903	26.91
Forest, Range, and Watershed Management	40,422	4.81
In Camp Projects	51,747	6.17
Camp Services	152,630	18.18
Building and Equipment Maintenance ..	54,951	6.60
Training	14,042	1.70
Game and Fish Habitat Improvement ..	17,419	2.09
Public Campground and Recreational Development	52,730	6.30
Search and Rescue	1,268	.15
Other Services	83,328	9.82
Totals	839,296	100.00

Oak Glen Job Corps Conservation Center

Since June 1965, the Oak Glen camp in Riverside County has been operated by the Division of Forestry as a Job Corps Center. This operation is carried on through provisions of a contract between the State of California and the U. S. Office of Economic Opportunity. During the beginning months of 1968, construction needed for camp expansion was completed and camp capacity was increased to its planned level of 170 enrollees. Three new staff positions were added during the year, bringing the total camp staff to 55 positions.

The basic objective of the Job Corps is to equip disadvantaged youth with attitudes and basic skills which they need to function in society. They are from 16 to 21 years of age, recruited on a voluntary basis from all over the United States. The typical enrollee has several problems which have prevented him from being successful either in school or on a job. All enrollees come from poverty backgrounds and are school dropouts or nonattenders. Most come from broken or nonexistent homes; most have medical or dental problems due to lack of care; and about one-third have histories of behavioral problems. The Job Corps program is a combination of educational processes designed to help these enrollees reach a self-supporting level of academic, vocational, and social skills.

The academic program at Oak Glen is operated by a staff of fully accredited teachers and a high school principal. The camp functions on an alternating, one-week-in-school, one-week-in-work schedule, so that on any day about half of the enrollees are in school.



The educational program at Oak Glen is operated by fully accredited teachers, including a high school principal. Instruction is based on individual teacher-student contact.

The academic program includes remedial, basic, and high school level instruction in reading, English, mathematics, and various job-oriented skills. Instruction is based on individual need and ability; the rate of progress of any enrollee is limited only by his ability and effort. Teaching methods rely heavily on programmed texts, self-instructing devices, and individual teacher-student contact. Progress is measured in performance achievement rather than in standard school grade level advancement. The average new enrollee starts at about the equivalent of the fourth grade level and has the opportunity to progress to the equivalent of a high school diploma while at Oak Glen.

The vocational training aspect of the Job Corps program was strengthened during 1968, and is in a continuous state of development. At Oak Glen, vocational training is carried out in the following areas: auto mechanic, painting, cooking, heavy equipment operation, and basic construction trades. Most vocational training in the Job Corps is done as on-the-job training on conservation work projects. To accomplish this vocational training and the conservation work needed in the local area, Oak Glen operates a typical conservation camp organization as part of the over-all program. The conservation program includes fire and safety training for all enrollees. Oak Glen fire crews were used frequently during the year, and accumulated approximately 26,850 man-hours of fire suppression time.

In addition to the academic, vocational, and conservation aspects of the program, a large effort is devoted to individual problems and needs of the enrollees on a 24-hour-a-day basis. The in-camp portion of the program is designed to use all aspects of camp life to help enrollees reach a more mature attitude towards themselves and society. Individual and group counseling is an important function of all staff members at the camp. Various individual and group activities such as physical education, sports, hobbies, and recreation also

contribute to the over-all learning and maturing process.

In summary, the Job Corps is a many-sided, intensive program aimed at providing enrollees with usable job skills and constructive attitudes in a short period of time. Obviously, this is a difficult task, but even so, close to 70 percent of the young men who have been enrolled in the Job Corps are now employed; a considerable number had little hope of any type of employment before they enrolled. In a majority of cases, the Job Corps does fulfill its objectives.

Neighborhood Youth Corps

The Neighborhood Youth Corps is an Economic Opportunity Act program, administered by the U. S. Department of Labor. The objective is to provide community service related jobs for young men and women from low-income families. These jobs are used as a method of training the young people in skills and attitudes needed by self-supporting citizens. Also, with earnings from Neighborhood Youth Corps jobs, many young people are able to continue in school, and to assist their families financially.

In 1968, the Division of Forestry cooperated in this program by providing on-the-job training and supervision for 40 Neighborhood Youth Corps positions. They included clerical, grounds maintenance, kitchen helper, shop helper, and warehouse aid positions. Screening, and referral of candidates to the Division of Forestry is done by the Department of Employment, local school districts, or Youth Opportunity Centers.

During the year, 60 youths were involved in the Neighborhood Youth Corps-Forestry program. In any program dealing with the economically disadvantaged segment of society, appraisals of success are varied. However, most of the Division employees who supervised Neighborhood Youth Corps workers were confident that the enrollees had gained valuable job experience, at the same time, had contributed to the over-all work output of the Division.

PUBLICATIONS OF 1968

Results of research, and activities of the Division are reported and distributed for information of the public in a variety of publications. Those in the following list were issued during 1968. All are related directly to forestry or other work of the Division; they were prepared by or in cooperation with the Resources Agency.

Papers and Reports Processed by Division and Department

"Annual Forest Practice Report—1967." 7 pp.

"Annual Report of Forest Fire Research, 1967-68." California Fire Control Notes No. 18, 11 pp.

"A Week of Wildfire in Southern California, 1967." [By C. R. Clar.] 9 pp.

"Brushland Range Improvement—1967." 24 pp.

"California Cone Crop for 1968," by C. J. Eden. State Forest Note No. 36, 7 pp.

"California's 1967 Fire Weather Severity," by William Innes and Rex J. Hess. California Fire Control Notes No. 17, 7 pp.

"California State Forests—1967." 9 pp.

"Emergency Revegetation of Burned Watersheds—1967." 18 pp.

"Forest Nurseries—1967-68," by C. J. Eden. 10 pp.

"Let Us Reduce the Incidence of Children and Matches Fires." by K. R. Goings. Calif. Fire Prevention Note No. 1, 7 pp.

"Production of California Timber Operators in 1966," by Daniel Dotta. State Forest Note No. 35, 6 pp.

- "Reforestation Studies—1967," by Ronald S. Adams. 17 pp.
 "Some Vascular Plants in Sonoma County," by W. Robert Powell. State Cooperative Soil-Vegetation Survey. 17 pp.
 "The State Forester's 1967 Report." 32 pp.
 "Transcript of Minute Records, California State Board of Forestry, April 1, 1885—Dec. 10, 1892." [Edited by C. R. Clar.] 46 pp.

Publications Resulting from Cooperative Effort of Division

- "An Aerial Method of Dispensing Ground Squirrel Bait," by R. E. Marsh. *Journal of Range Management* 21(6):380-384. 1968.
 "A New Species of Pleuronectocelaeno (Acarina, celaenopidae) Associated Bark Beetles in North and Central America" by D. N. Kinn. *Acrologia*, February 1968. 5 pp.
 "Antennal Morphology of *Ips confusus* (Coleoptera: Scolytidae)," by J. H. Borden. *Annals of the Entomological Society of America*, January 1968, 4 pp.
 "A Transistorized Body Capacitance Relay for Ecobehavioral Studies," by M. Zacker and Walter E. Howard. *Animal Behavior* 16 (1):65-66.
 "Aversion to Strychnine Sulphate by Norway Rats, Roof Rats and Pocket Gophers," by W. E. Howard, S. D. Palmateer and M. Nachman. *Journal of Toxicology and Applied Pharmacology* 12:229-241. 1968.
 "Brevicomin: Principal Sex Attractant in the Frass of Female Western Pine Beetle" by R. M. Silverstein, R. G. Brownlee, T. E. Bellas, D. L. Wood, and L. E. Browne. *Science*, February 1968. 3 pp.
 "Controlled Mating, Karyology, Morphology, and Sex-Ratio in the *Dendroctonus ponderosa* Complex." by G. N. Lanier and D. L. Wood. *Annals of the Entomological Society of America*, March 1968, 9 pp.
 "Control of Forest Rodents in California," by R. E. Cole. Proc. 2nd Annual Central Coast Counties Weed and Vertebrate Pest Control Conference, Santa Rosa, California, May 8, 1968.
 "Do Fire Retardants Contaminate Helicopters?" by James B. Davis and Marvin J. Dodge. *Fire Technology* 4(1):17-24, February 1968.
 "Effective Production Rates and Cost-Efficiency Values for Four Air Tanker Types at Eleven Northern California Airports," by James E. Maloney. Univ. of Calif. Sch. of Forestry and Conserv. Working Paper No. 14. 21 pp.
 "Expected Production Rates of Five Air Tanker Types at Eleven Northern California Airports," by James E. Maloney. Univ. of Calif. Sch. of Forestry and Conserv. Working Paper No. 13. 55 pp., mimeo.
 "Follow-up Evaluation of Fire Hazard Inspection Procedures—Butte County, California," by William S. Folkman. U.S. Forest Service Res. Note PSW-169, Pacific SW. Forest and Range Exp. Sta., Berkeley, Ca., 5 pp.

- "Food Detection by Deer Mice Using Olfactory Rather than Visual Cues," by Walter E. Howard, Rex E. Marsh, and Ronald E. Cole. *Animal Behavior* 16(1):13-17. February 1968.
 "Forest Pest Conditions in California—1967," by California Forest Pest Control Action Council. Office of State Printing, 24 pp.
 "Photochemical Oxidant Injury and Bark Beetle (Coleoptera: Scolytidae) Infestation of Ponderosa Pine" by R. W. Stark, P. R. Miller, F. W. Cobb, Jr., D. L. Wood, J. R. Parmeter, Jr., and E. Zavarin. *Hilgardia* May 1968. 3 pp.
 "Rainfall Interception by Annual Grass and Chaparral . . . Losses Compared," by Edward S. Corbett and Robert P. Crouse. USDA Forest Service, Research Paper PSW-48. 1968. 12 pp., illus.
 "Redwood Mountain," by Harold Biswell and Harold Weaver. *American Forests*, August 1968.
 "Response of *Ips confusus* to Synthetic Sex Pheromones in Nature," by D. L. Wood, L. E. Browne, W. D. Bedard, P. E. Tilden, R. M. Silverstein, and J. O. Rodin. *Science*, March 1968, 3 pp.
 "Soils and Vegetation of the Chanchellula Peak Quadrangle, Shasta and Trinity Counties," by J. I. Mallory, E. B. Alexander, and W. L. Colwell. State Cooperative Soil-Vegetation Survey. 48 pp., with maps.
 "Some Recent Rodent Control Research and Its Practical Application," by R. E. Marsh. Conference of Southern California Weed and Vertebrate Pest Control Regulatory Officials, Riverside, California, May 8, 1968.
 "The Cause of Red Band Needle Blight in California" by F. W. Coot, Jr., and D. R. Miller. *Journal of Forestry*, December 1968, 4 pp.
 "The Life History of *Ips calligraphus* (Coleoptera: Scolytidae) with Notes of Its Biology in California" by D. L. Wood and R. W. Stark. *Canadian Entomology*, February 1968 6 pp.
 "The Pines of Cedros and Guadalupe Islands," by W. J. Libby, M. H. Bannister, and Y. B. Limhart. *Journal of Forestry*, November 1968.
 "Why Not 'PERT' Your Next Resources Management Problem?," by James B. Davis. *Journal of Forestry* 66(5):405-408, May 1968.

Printed Articles and Books (by Division Personnel)

- "Controlled Burning on California Wildlands," by F. H. Raymond. *Proceedings California Tall Timbers Fire Ecology Conference*, Nov. 9-10, 1967: 151-162.
 "Four Chemical Conditioners Do Not Improve Condition of Four Conifer Seedling Species in California Test," by Ronald S. Adams and C. J. Eden. U.S.F.S. *Tree Planter's Notes* 19(1):14-18. March, 1968.
 "History of the Division of Forestry Nursery Program" by Ronald S. Adams. California Christmas Tree Growers' Association *Bulletin*. July 1968.







